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Taxation Under Government Ownership

E. M. Heigho, in a letter published elsewhere, referring to the estimate made by Sir George Paish that a saving of from 60 to 130 million dollars might be made in the cost of railway capital under government ownership in the United States, raises the question whether this saving would not be reduced by the amount of the 135 millions paid in taxes by the railways in 1913. It is true, as Mr. Heigho suggests, that as federal government property the railways would be relieved of taxation. But the federal government would not actually lose, because as the owner of the railways it would be the beneficiary of the saving made in the taxes that otherwise would be paid to itself. And as between the states and municipalities, on the one hand, and the federal government on the other, what the former would lose in taxes, the latter, as owner of the railways, would gain by not having to pay them. Therefore, on the whole, in the matter simply of taxes, the federal government would be the gainer, while the states and municipalities would be just equally heavy losers, and would be compelled to make up their loss by increasing the taxes on other property.

Traffic Officers as Trade Promoters

The officers of the traffic department of the Lehigh Valley propose to spend a week, and two weeks, or more, if necessary, in explaining South American trade opportunities to the manufacturers in the dozen principal cities along the company's lines between New York and Buffalo. They are going to run a special train, and stop in each place as long as may be necessary to see every interested shipper; and, as far as possible, they are going to give out first-hand information. For example, details of shipping methods will be explained by a man experienced in exporting goods to South America. Another man on the train will be the manager of the foreign department of the National City Bank, of New York, which has recently established branch banks in Buenos Aires, Rio Janeiro and Valparaiso. New York consuls of South American republics will go on the train or send representatives. From teaching farmers how to plant corn and spread fertilizer, and their wives how to make and sell butter and jam, the railway traffic manager has grown in a few years to be the most versatile "promoter" in the country. Banks and boards of trade have copied some of the railways' educational schemes, and at times it has looked as though the traffic man might be called on with discouraging frequency to share his laurels; but the action of the Lehigh Valley people indicates that the watchful railway promoter is liable any day to find some new field of effort. Not the least useful feature of this South American propaganda is a fifty-page pamphlet, issued with the "Compliments of the Lehigh Valley," summarizing in lucid form the varied and voluminous information on this subject which otherwise could be had only by extensive studies.

Prevention of Locomotive Smoke

In a paper entitled "A Practical Method of Handling Locomotive Smoke," presented before the ninth annual convention of the International Association for the Prevention of Smoke recently at Grand Rapids, Mich., the writers, a committee of the Railroad Smoke Inspectors' Association of Chicago, state that the most important features in smokeless firing are eternal vigilance on the part of the smoke inspectors and the authorities controlling the engine crews, the careful instruction of the engine crews as regards the manner of firing and operating locomotives and the special smoke-consuming devices, the cooperation of the engineers and firemen, and, if possible, the use of one grade of coal. These points certainly cover the smoke question very thoroughly, and when they are closely and consistently observed, there is no question that much will be done toward the elimination of locomotive smoke. Perhaps the most

important of these items is the careful instruction of the engine crews. Without this the value of any smoke-consuming device placed on the locomotive will be lost. The instruction of the engine crew should not be restricted to the fireman. Oftentimes the engineer is the one who most needs to be told a good deal about smoke prevention. He may have been brought up in the old days when it was thought that an engine which was not smoking was not steaming properly. This notion should be removed from his mind, and he should be made familiar with the proper methods for smokeless firing in order that he may properly control the work of his fireman. There is also need of close co-operation between the engineer and fireman, and unless the engineer is made to see the reasons why a certain method of firing should be used and thoroughly understands it he is likely not to give his firemen the support he should.

That smokeless firing may be properly maintained, eternal vigilance on the part of the smoke inspectors is absolutely necessary. Perhaps the most effective and satisfactory plan of smoke inspection is in use at Chicago. That city covers an area of 191 square miles, which is overspread with tracks and yards on which operate engines of every road entering it. It would be impossible for each road satisfactorily to inspect all of its engines operating over the entire district. In order to secure satisfactory inspection the Railroad Smoke Inspectors' Association of Chicago was formed under the direction of the General Managers' Association, as has been previously described in these columns. It is now the duty of each smoke inspector to report locomotives of all roads impartially. Since this system has prevailed the average density of smoke emitted from locomotives has been reduced from 11.99 in 1912 to 6.034 in 1914. The plan has worked with very little friction and is recommended for other large localities where operating conditions are similar.

KEEP A STIFF UPPER LIP

THE present in the United States is the kind of a time when strong men show their strength and weak men show their weakness. Six weeks ago the outlook for business throughout the United States generally, and in the railway and railway supply businesses particularly, was promising. It looked as if, when the fiscal year was ended and the decision of the Interstate Commerce Commission in the rate advance case was rendered, the corner would be turned and prosperity would be renewed. But the decision in the rate case was unexpectedly delayed and before it was handed down Europe was involved in a terrible war. It was unavoidable that the beginning of this war should affect business in the United States unfavorably and to a great degree. It was inevitable that it should force a painful readjustment in many directions. We are now going through this period of readjustment and almost everyone is keenly feeling the effects of it. The consequence is most business men are assuming a pessimistic tone and are disposed drastically to reduce their organizations and cut expenses in every direction.

Is this wise? Does the situation justify the adoption of such a policy? When a storm comes up it is desirable to take in sail, but it is never considered desirable entirely to destroy the sails because it is assumed that after the storm is over there will be further use for them. Now, under present conditions it is undoubtedly desirable for business concerns generally, and those in the railway and railway supply fields particularly, to proceed cautiously. But is there not great danger of carrying retrenchment so far as not merely to protect the solvency of the concerns affected, but as to lose the opportunities which the war is opening up and make it impossible for the concerns which do the severe retrenching to handle their business successfully and profitably after the war is over?

At home all the underlying conditions are sound. Abroad the war is opening up for American manufacturers and exporters markets in South America, Asia and even in Europe itself, which, to a large extent, have been closed to them. Are we not thinking too much about the dark side of this cloud and not enough about its silver lining? Is there not being manifested too general a disposition to take flight before the danger with which American business apparently is menaced, and not enough disposition to meet the situation squarely, to confront the seeming menace courageously, and to put up a good fight for better business?

It is a familiar fact that in almost every shake-up in any kind of business concern the incapable men suffer while the capable ones gain. The weak go down while in the long run the strong keep on climbing almost regardless of what occurs. The same thing applies to business concerns in the same field or in the same country, and it applies to the business men and business concerns of different countries. Are the business men and business concerns of America really weak or really strong as compared with those of other countries? If they are weak they will be injured both relatively and absolutely by the crises which we are going through. If they are strong they will benefit by it both relatively and absolutely.

There is opportunity as well as danger in the present situation, and probably some concerns will be ruined by it and others will take advantage of the opportunity it offers and profit by it. And those which will be ruined will be those which assume the defensive, pull their organizations to pieces, quit seeking business and think of nothing but saving money, while those which will gain by it will be those which hold their organizations together with a firm hand, assume the aggressive and make a real fight, not merely to keep down expenses, but to hold all the business that they have and to get the business that their weaker competitors are letting slip away from them.

THE PROPOSED FREIGHT TAX AND THE PORK BARREL

DESPATCHES from Washington last week indicated that the people of the country might have an opportunity to experience what would be, in effect, to consumers, a general advance in freight rates, despite the laudable efforts of the Interstate Commerce Commission to hold down the cost of living. The House Ways and Means Committee included in its emergency war tax bill a provision for a three per cent tax on railroad, steamship and express freight shipments, to be added to the freight bill and collected by the carriers, the remainder of the war tax to be levied on beer and wine. Based on the freight earnings for the fiscal year 1913, which the Interstate Commerce Commission reports as $2,198,930,565, this would produce a revenue of about $66,000,000 a year on railroad freight, which, as we have often been reminded, would be a charge on the ultimate consumer.

A five per cent advance in freight rates, for which the eastern roads asked, but which they were denied, would amount to about $110,000,000 if applied over the entire country. This is $44,000,000 more than the proposed tax would amount to; but the tax would be plenty large enough to test the extent to which a general advance in freight rates would operate as a hardship on the public. The railroad contention has been that the general public would hardly notice the effect of a five per cent increase in rates as reflected in the prices of commodities. It is interesting to note, therefore, that the selection of freight for taxation is ascribed to the desire of the Democratic leaders to distribute the burden as widely as possible by an "indirect charge on the consumer imposed in such a way as not to annoy the man who was thinking of voting the Democratic ticket"; and it is easy to believe that, as reported, the President favored a tax on freight rather than on passengers.

Under other circumstances the railways would have little reason for objecting to being made tax collectors for the government. The machinery is provided. They could simply add the United States to their interline accounts, and would receive one per cent of the collections. And, of course, there is no real question that the traffic will bear the tax.

But the rank absurdity of the government's position was quickly disclosed. It was seen that it was proposed to make,

in effect, a general advance in freight rates, which the railways need and have been refused, and to use the proceeds, not to maintain the solvency of the railway companies, to improve the efficiency of transportation, and to distribute throughout the country in wages and in the purchases of equipment money whose disbursement in this way is neded to revive general business, but rather to spare the government the painful necessity of practicing the sort of economy it has so long preached to the railroads, and in order to escape levying a tax on whiskey, tobacco, patent medicines, legal instruments and other proper subjects.

The shippers, generally speaking, had not objected to the five per cent advance proposed by the railways. Many of them openly advocated it. And they probably would not seriously object to paying a three per cent tax on their freight shipments, certainly not if they thought it were needed. But they probably would organize a strong opposition to attempts to both make a general advance in rates and impose a tax on freight.

The railways needed an advance in rates before the development of the emergency created by the war, which has so seriously interfered with the movement of their traffic and with the marketing of their securities. While prices in other businesses have advanced, the average freight rate per ton mile has been reduced from 7.63 mills in 1903 to 7.27 in 1913; and meantime railway expenses have greatly increased. Railway taxation has already been increased from $57,849,569 in 1903 to $129,052,922 in 1913. And yet, in the face of all these facts, it was nonchalantly proposed to raise $66,000,000 out of an estimated war tax of $107,000,000, not from the railroads directly, it is true, but by laying a tax on the public in such a way as greatly to increase the difficulties met by the railways in obtaining the advances in rates which they so sorely need!

The railways have been censured for wasting their revenues, but the railway managers have less need for advice on this subject than for assistance in putting some of it into practice. Moreover, the worst forms of extravagance practiced by the railways have been economy itself compared with the least extravagant practices of the United States government. Our government is so ill-managed that its extravagance and inefficiency have become proverbial. Even while the President was asking Congress for a war tax of $100,000,000 Congress was about to appropriate $93,000,000 for the annual river and harbor "pork barrel." Later reports indicate that the receipt of thousands of telegrams of protest from "back home" has induced the senators in charge of the "pork" bill to cut off appropriations for all new projects, thereby reducing the total by about 50 per cent. This would leave about $46,000,000 to be expended largely for the benefit of politician-contractors. What "drastic economy" this represents will be appreciated when it is noted that the average annual appropriation for river and harbor improvements for the last seven years has been $37,500,000, and that the appropriation of $51,118,889 for 1914 was the largest during that time.

In other words, at a time when the railways are struggling desperately to keep up their earnings and to keep down their expenses, at a time when the business of the country is in bad shape largely owing to the situation in which the railways find themselves, the leaders in Congress felt free to take from the shipping public $66,000,000 a year which ought to go to the railways in order that Congress might make "pork barrel" river and harbor appropriations amounting to $6,500,000 more than the average river and harbor appropriations of the past seven years!

Fortunately the protests against this reckless stupidity came very promptly, and from the press of all political complexions; and after a few days of hedging the freight bill tax was dropped. The caucus decided definitely on the evening of the 15th to draft a bill imposing stamp taxes and other taxes which have been shown by experience to be rational from a business standpoint, and sound politically.

HOW TO GET PROMOTED

NAPOLEON BONAPARTE, the greatest organizer of men the world has ever seen, taught each soldier to feel that he carried in his knapsack a marshal's baton; and Vice-President Taylor, of the Mobile & Ohio, in his recent address before the superintendents' association at New York (*Railway Age Gazette*, August 28, page 389) declared that, for railroad officers, this incident carries the most important lesson that is to be learned from the great general's career. The railroad superintendent who would create enthusiasm and solidarity among his forces must impress on the men the fact that promotions will be made from the ranks. And the speaker implied, of course, that this policy of using "home talent" should be the fact. It is out of the question to impress employees with a "fact" which is impaired by so many exceptions that they cannot believe in its existence.

And to fill responsible positions from the ranks implies that men in the ranks are all the time being educated for higher places. Innumerable appointments have been made from the outside world because the appointing officer could not find among his own men the most suitable candidates. Instead of providing systematic education he trusted his men to educate themselves, and they failed to do so. Mr. Taylor's appeal, if we read between the lines, is, therefore, a call on the superintendent (and his right-hand man, the trainmaster) to educate employees to look upon that imaginary baton with an intelligent appreciation of what a baton is for. Dreaming of future power is a pleasant occupation in which many a young man has spent far too many hours. It might be a good thing, in this present humdrum world, to modify Napoleon's dictum by telling the ambitious railway employee to indulge in that dream for about seven minutes each week, and to spend the rest of his available time in studying the conduct of men who actually wield batons today, to see how they turn the trick. For, in truth, we are here using highly figurative language. The real desideratum is not a symbol of power, but actual ability to exercise power; a mental equipment which enables one, first, to know how to do railroad work in the best possible manner, and, second, to successfully guide other men in doing such work. The brakeman who aspires to be a conductor ought to study conductors' work ten times more assiduously than the average brakeman usually does study. Conductors who make sad blunders in their first six months' service simply because they neglected earnest study beforehand are to be found on every hand. The far-sighted fireman who aspires to be a locomotive runner does not content himself with passing his successive examinations; he studies, night and day, so as to attain to a 100 per cent proficiency. The station agent who expects to rise to a superintendency—or even halfway there—not only studies the rule book and the innumerable circulars which he receives from headquarters; he studies the relations of railways to the public, the knotty problems of the labor question and other things far beyond his present duties. He realizes that if his acts as a superintendent are to measure up to a fair standard of efficiency, his thoughts or studies must go far beyond a fair measure; he must aim to know *everything* bearing on the duties of a semi-public officer managing an important public service.

And, speaking of superintendents, this little lesson which was set forth by Mr. Taylor was admirably supplemented, a week later, by another, equally brief, by General Superintendent W. E. Williams of the Missouri, Kansas & Texas (*Railway Age Gazette*, September 4, page 444). Mr. Williams, writing of the work of the trainmaster, tells that officer that he can do important tasks for the superintendent, and adds this significant injunction: "In making investigations, so arrange your report that it will conclude the matter; so that the superintendent will not have to follow after and conduct an additional investigation." That is setting a pretty high

standard; but what lower one can be called satisfactory? One may adopt a compromise theory; aim to make reports which probably (not surely) will suit the superintendent and trust that he, rather than humiliate you by himself making further investigations, will recommit the matter to you. That is easier. But to make a report which shall be entirely satisfactory not only accomplishes the primary purpose of saving the superintendent's time; it educates the man who makes it; and he gets more profit from it than does the superintendent.

To make a report that will surely be acceptable it is necessary to explore a subject to its utmost limits. If it is necessary to go to the biggest library or to visit a half dozen cities, the situation must be faced in a business-like way. If there is another trainmaster on the road whom the superintendent may think could do the job better, the trainmaster must show him that that supposition is unfounded. Can the superintendent have any wavering of opinion as to what is the right conclusion in the matter? The trainmaster should be prepared to compel him by unanswerable logic to come to a decision. Does this task demand research and night work? The trainmaster should be prepared to get someone on his staff to relieve him of a part of his work, so that he can do the night work without impairing his general personal efficiency. These few suggestions will indicate the comprehensive nature of Mr. Williams' simple demand for "conclusive" reports.

To be able to command, one must first learn to obey. To be capable of being a general manager, one must learn to serve a general manager efficiently. George Findlay, former general manager of the London & North Western, in his book on the Working and Management of an English Railway, gives four rules for the conduct of his office, and the second one is this:

> Before any question is submitted to you for decision, insist upon having all the details filled in, and all the facts before you, so that you may not have to apply your mind to it a second time, but may decide it once and for all with a full knowledge of all its bearings.

If *your* boss is so easy and amiable that he has not adopted this rule—why, that is bad for you!

M. C. B. RULES OF INTERCHANGE

THE time is drawing near for the changes in the M. C. B. Rules of Interchange to go into effect, and it is the duty of every railway mechanical officer to see that the men under his jurisdiction affected by these rules thoroughly understand them. The important changes made this year are in Rule 1, the footnote under Rule 42, and Rule 120. The change in Rule 1 requires each railway company to give foreign cars, while on its line, the same care as to repairs that it gives to its own cars, the previous rule mentioning only "running repairs." This change was made to obviate differences of opinion regarding what constituted running repairs, and also to obtain more complete repairs to the railroad equipment. The chief purpose of this rule is to eliminate bad order cars in so far as possible, and if the roads will repair the foreign cars as conscientiously as they do their own, no matter whether they are repairing defects for which the repairing road or the owner is responsible, much good will come from this rule. The number of bad order cars will be reduced, the cars will be maintained in a more serviceable condition, the car shortage will be reduced, a smaller number of cars will be required, and the car situation will be materially improved. The railroads must pull together, for without the co-operation of all the full benefit of this rule will not be realized.

The foot-note under Rule 42 is intended to eliminate the present practice of holding a car for the owner's authority to repair combinations of defects involving decayed parts, or longitudinal sills requiring renewal or splicing due to elongated holes, or to sills split on this account—a joint inspection statement serving as the necessary authority. Considerable good may be expected from this change, for the roads can get the authority for making the necessary repairs much more quickly, and thus eliminate to some extent the accumulation of defective cars.

The new Rule 120 removes the necessity of home routing cars in a general worn-out condition, and gives the car owner the option of having the reported car rebuilt or destroyed. It is believed that this rule will greatly expedite the handling of cars in this condition, and by doing away with the home route card it is surely relieving the roads of hauling some very undesirable cars. In the past it has been found that some roads are very slow about advising as to what shall be done with such cars, the delay running from a year to 18 months. This crowds the repair tracks of the handling line, and in several instances it has been a cause of great annoyance. All roads should make it their business to reply to the report of the joint inspectors just as soon as possible so that the handling line may make a prompt disposition of the car. If the car is to be rebuilt it is to the financial advantage of the owner to reply promptly for per diem ceases on the date of the request for the disposition of the car by the handling line, and if it is to be destroyed the owner should be only too glad to extend the courtesy of a prompt reply to the handling line.

Those making the joint inspection should be persons in whom the owner can place the greatest confidence, and should be men whose experience justifies their acting in that capacity. In other words, the best men available in the locality in which the inspection is to be made should be chosen as joint inspectors. If this policy is followed the owner will feel perfectly sure that his interests have been carefully considered, and will be more likely to give the necessary authority promptly.

NORFOLK & WESTERN

THE growth of coal traffic on the Norfolk & Western in the last five years has been quite remarkable, not only the actual tonnage carried having increased largely each year, but the proportion of coal to other traffic has also increased. Thus in the fiscal year ended June 30, 1910, the tonnage of bituminous coal carried was 13,990,000 tons, which was 55.04 per cent of the total tonnage carried. In 1914 the tonnage of bituminous coal was 23,220,000 tons, or 64.71 per cent of the total tonnage carried. The gain in coal tonnage in 1914 over 1913 was 2,060,000 tons, or nearly 10 per cent.

It was largely due to this increase in coal tonnage that the Norfolk & Western's earnings in 1914 compared favorably with 1913. Total operating revenues amounted to $44,470,000 in 1914, an increase of $730,000, or 1.67 per cent. The total amount available for dividends, however, was $9,350,000 last year as against $10,190,000 the year previous, a decrease of over 8 per cent. It will be seen, therefore, that there was a disproportionately large increase in expenses or deductions from gross income. As a matter of fact, the increase came both in expenses—4.80 per cent—and in deductions—5.76 per cent.

It is particularly interesting to see why expenses should have increased to a greater extent than the increase in volume of traffic when the greater part of the increase in traffic was in the low grade commodity coal, and the tonnage of many other commodities which are generally more expensive to handle, such as manufactures, merchandise and miscellaneous commodities, decreased. The following table shows the per cent of each class of operating expense to total operating revenues in 1914 and 1913:

	1914	1913
Maintenance of way and structures	11.24	12.67
Maintenance of equipment	20.72	19.06
Traffic expenses	1.66	1.58
Transportation expenses	31.64	30.16
General expenses	2.06	1.84
Total	67.32	65.31

The Norfolk & Western operates 2,036 miles of road. This is an increase in the average operated in 1914 over 1913 of 13 miles. In 1914 there was 491 miles of second-track and 1,230

miles of sidings and yard tracks. There was an increase during the year of 40 miles of second-track and 79 miles of sidings and yard tracks.

Besides this coal traffic, manufactures and products of forests furnished the larger proportion of the traffic. In 1914 manufactures furnished 9.98 per cent as against 11.02 per cent in the previous year, and products of forests, 6.20 per cent as against 7.10 per cent.

Even allowing for the fact that the Norfolk & Western has a large proportion of second-track, the freight density is heavy. The revenue tons carried one mile per mile of road was 4,500,000 in 1914 and 4,380,000 in 1913. The passenger density—passengers carried one mile per mile of road—was 113,000 in 1914 and 109,000 in 1913.

It will be noted that the principal increases in operating expenses were in maintenance of equipment and in transportation. Transportation expenses amounted to $14,070,000 in 1914, an increase over the previous year of 6.64 per cent. In its separation of expenses as between freight and passengers, which is probably made on the same basis as that of the Pennsylvania Railroad, namely, largely on a train-mile basis where it is not easily possible to allocate direct, the Norfolk & Western shows an increase in 1914 over 1913 in transportation expenses for freight from $11,310,000 to $12,080,000, and for passengers from $1,880,000 to $1,990,000. The increase in passenger expenses is easy to understand. The increase in passenger mileage was 4.44 per cent; in passenger train mileage, 2.66 per cent, and in passenger locomotive mileage, 3.12 per cent. In addition there were the increased wage costs and an increase in fuel costs, which will be mentioned later. The increase in freight transportation expenses was in the face of a decrease of 1.59 per cent in revenue freight train mileage and 1.05 per cent in freight locomotive mileage, with an increase in average trainload of 38 tons, or 5 per cent. As has already been mentioned, the proportion of slow drag freight was greater in 1914 than in 1913, and beside the better trainload there was better carloading per loaded car—in 1914, 31.60 tons, and in 1913, 30.57 tons. This would be expected with an increase in the coal traffic, as would also an increase in the empty car mileage.

The total freight car mileage in 1914 was 483,820,000, an increase of 3.88 per cent, while the increase in eastbound empty mileage was 9.33 per cent, and in westbound, 11.32 per cent. It is interesting to note that while the mileage of all Norfolk & Western cars increased 11.39 per cent and was 63 per cent of the total car mileage, the mileage of foreign freight cars decreased 7.18 per cent and was 37 per cent of the total freight car mileage. The Norfolk & Western received a large number of freight cars during the year, and the average number in service on all roads in 1914 was 43,787, and in 1913, 41,174. This, coupled with the fact that the increase in traffic was in coal, explains the much smaller proportion of foreign mileage, but does not explain why the hire of equipment credit balance should have been less in 1914 than in 1913.

Detailed figures for operating expenses show that by far the largest single item in the increase in transportation expenses was in the cost of fuel for road locomotives. This was $2,900,000 in 1914, an increase of 13 per cent over 1913. Fuel per engine mile was more expensive in 1914 than in 1913, both because there was an increase in the cost per ton of coal and because less engine miles were made per ton of coal. The average pounds of coal per engine mile in 1914 was 2.15, and in 1913, 2.02. This is an increase of a little less than 6 per cent. The average cost of fuel per 100 engine miles was $11.19 in 1914 and $9.93 in 1913, an increase of a little less than 13 per cent.

The increase in maintenance of equipment expenses was due to considerably larger expenditures on repairs and also to larger charges for depreciation. The increase in depreciation charges for locomotives was 12.20 per cent; for passenger cars, 30.93 per cent, and for freight train cars, 12.35 per cent. Of course there was more equipment in service on which to charge depreciation, but whether or not this would account for all of the increase in depreciation charges it is hard to say. The following table shows the charges for repairs, renewals and depreciation per unit of equipment:

	1914	1913
Locomotives	$3,120	$2,934
Passenger train cars	870	994
Freight train cars	108	103

During the year the tractive power of total locomotives in service increased 3.19 per cent; the seating capacity of passenger train cars, 20.68 per cent, and the tonnage capacity of freight train cars, 16.16 per cent. This is a very large increase in available equipment and the increase in coal cars probably in part accounted for the large increase in coal tonnage, many times, especially in the early part of the year, in West Virginia desiring to ship more coal than there were always coal cars for.

Few railroads in the United States are in a stronger financial position than is the Norfolk & Western. Through skillful financing—in recent years by the issue of convertible debenture bonds—the company has kept its proportion of funded debt to capital stock comparatively low. At the end of 1914 there was $111,645,000 funded debt outstanding and $130,760,000 stock. The sale of convertible debentures cost the company less for its money than would have the sale of stock. As the earnings grew and the amount available for dividends increased, these debentures were converted, and while this increased the dividend requirements, it widened the margin of safety above interest charges. Thus, while the debentures outstanding increased during 1914 by $10,726,000, this increase wiped off $17,139,000 subscriptions for debentures, the common stock having been increased by $7,627,000, due to the conversion of debentures. Even in 1914 the company earned a net available for dividends of 8.68 per cent on its common stock after having paid the 4 per cent on its $23,000,000 preferred.

There was appropriated from surplus $2,094,000 for additions and betterments, and including this amount, there was $7,264,000 spent for additions and betterments. An issue of $10,000,000 equipment trust certificates was sold during the year, and besides paying off $1,300,000 of matured certificates, a large amount of new equipment was bought, which included 10 passenger locomotives and 16 freight locomotives, 4,327 hopper coal cars of 57½ tons capacity, and 748 flat bottom gondola cars of 90 tons capacity.

In commenting on the financial changes, President Johnson has the following to say:

> The urgency of the requirements for additional facilities to be met by that issue of convertible bonds was set forth in the circular dated January 30, 1913, to the stockholders. Early in the year, however, the unfavorable outlook led to the curtailment of expenditures for additions and betterments by postponing the less urgent and reducing the rate of progress upon the more important. This left temporarily in the treasury a considerable balance of funds raised for such expenditures. In order to secure a greater revenue therefrom than was obtainable from ordinary deposits (suitable authority having been given by your board) these funds have been utilized from time to time to purchase well secured short term obligations, maturing in conformity with the company's cash requirements. A substantial addition to the company's dividend and interest income has thus been made.

These short term investments mentioned by President Johnson all mature in 1914 and 1915, and include short term railroad notes, equipment trust certificates and quite a number of municipal issues. They are carried on the books at $12,353,000. In addition the company has $8,010,000 cash, with total working liabilities of but $3,550,000.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Average mileage operated	2,036	2,023
Freight revenue	$38,038,622	$37,588,024
Passenger revenue	4,908,679	4,715,294
Total operating revenue	44,470,619	43,739,921
Maint. of way and structures	4,998,612	5,542,960
Maint. of equipment	9,214,007	8,336,631
Traffic expenses	737,690	691,558
Transportation expenses	14,068,577	13,192,922
General expenses	916,954	801,742
Total operating expenses	29,935,842	28,565,813
Taxes	1,620,000	1,552,000
Railway operating income	12,894,903	13,714,499
Gross income	14,892,293	15,478,981
Net income	10,268,140	11,106,641
Dividends	7,180,592	6,706,465
Surplus	3,087,548	4,400,176

Letters to the Editor

RAILWAY TAXATION UNDER GOVERNMENT OWNERSHIP

New Meadows, Idaho, September 3, 1914.

To the Editor of the Railway Age Gazette:

In your issue of August 28, 1914, I note an article headed "Savings Under Government Ownership," in which Sir George Paish is quoted as estimating a saving in the annual cost of railway capital, which could be made in the United States under government ownership of from 60 million dollars to 130 million dollars per annum.

Is it not true that the taxes paid by the railways of the United States for the calendar year of 1913 amounted to $135,321,866, and is it not true that under government ownership the railways, as government property, would be relieved of taxation, and therefore does it not follow that at the highest estimated saving from government ownership there would be a loss of over 5 million dollars, and at the lowest of 75 million dollars since all of the taxes are at the present time applied to purposes of government of one sort or another?

Briefly, would not the government, federal, state and municipal, actually lose the difference between the amount of taxes now paid by the railways and the amount which would be saved in other ways by reason of governmental ownership of railways?

E. M. Heigho,
President and General Manager, Pacific & Idaho Northern Railway.

SENATOR BOURNE ON GOVERNMENT OWNERSHIP

New York, September 15, 1914.

To the Editor of the Railway Age Gazette:

You have reported briefly the strong declaration of the Bourne committee against government ownership of mail cars (September 4, page 436). This part of the committee's report will bear further emphasis. A positive and plausible statement from an apparently reliable source, will always be accepted by most people as true, however, erroneous it may be as a matter of fact. This is particularly the case with a statement from a government official appearing in printed form, like that of Postmaster-General Vilas in 1887, cited by the committee. He declared that the government would save a million and a half dollars yearly by purchase and ownership of the railway postoffice cars. The statement appeared plausible and there was no contradiction. For more than 25 years this declaration has been accepted as true by the great majority of people. No proof on the subject was presented.

But in this report Mr. Bourne shows that if the government owned the cars and paid the railroads the usually prevailing rates for transportation of similar cars, and paid the expense of maintenance, repairs, inspection, icing, cleaning and lighting, the government would pay more than it does today.

After presenting statistics showing that under government ownership of railway postoffice cars the expense to the government would be greater than under ownership by the railroads, Mr. Bourne asserted that purchase of the railway postoffice cars would also be unwise because it would be the beginning of a general government ownership policy, eventuating in bureaucratic paternalism, inertia, and, inside of a century, governmental dissolution. He cited the fact that under general government ownership of public utilities there would be over three million governmental employees; that in the last ten presidential elections the President has been elected by a plurality of from 7,000 to a little over 2,500,000, and that, therefore, government employees could absolutely control the government, the tendency being more pay, less service in governmental employment, resistless efforts on the part of outside labor to secure government employment, because less onerous and more remunerative, and dissatisfaction and irritation in all private enterprise. Mr. Bourne's chief objection to government ownership is apparently because of the bureaucratic system which would be built up; and he concludes his discussion of this subject as follows:

"Governmental efficiency and economy of operation can never equal that of private enterprise, and the whole desiderata of government should be equal legal opportunity for all and limitation on individual liberty only in the prohibition of preying on the personal or property rights of others. Our present drift to departmental rule and regulation, instead of a government by law, which is the greatest menace to the future of our country, would, in our opinion, be greatly accentuated by governmental ownership."

E. R. S.

WAGES NOT SALARIES

July 8, 1914.

To the Editor of the Railway Age Gazette:

The letter from "Operating Officer" in your issue of June 19 calls attention to a point which heretofore has been given very little consideration. That such is the case, operating officer made quite clear, but it would not be well to embrace other lines of railroad activity that have grievances of a more pressing nature. I make no complaint about my own salary, but wish to call attention to the men under my jurisdiction, whose periods of service with the company for which I work range from 5 to 35 years in the capacity of concrete foremen and bridge foremen. Each one of these foremen before being appointed such had seen not less than five years service with this or some other railway company in the capacity of laborer, carpenter helper or carpenter, whose average monthly wages for the laborer and carpenter helper rarely exceeded $65 per month, while the carpenter generally obtained $15 more. Foremen, both concrete and bridge, generally draw $100 per month, or thereabouts, for services that call for a knowledge in the reading of plans and execution of work that requires many years to acquire. The men above referred to are not complaining about the wages paid them, but the purpose of this letter is to contrast such wages, which, by the way, "operating officer" should have done for section forces, with the wages of brakemen and conductors and enginemen. The former (brakemen) draw $100 per month and over, probably for the first month's service they render, while the conductors receive $165, and those on work trains exceed the $200 mark. Brakemen and many conductors, spend their spare time "studying" how to avoid work as per schedule, while any common sense man would decide what they should do inside their hundred mile run or ten hour day.

I have been on washout work where bridgemen were face to face with real danger while brakemen and conductors sat nearby looking on if they were interested, but never volunteering to give a helping hand, the engineer being the only man of the work train crew that was at work. Man for man the bridgeman is the equal if not the superior of the trainman. A man who is now vice-president of one of the big systems told me that the bridge crew is unquestionably the most efficient unit in railroad work today.

In the matter of consideration the conductor and his family can get passed on the best trains. Only a few mornings ago, I saw a conductor, his wife and two children on one of the best trains on the continent. I had asked for a pass on the same train, returning from a wedding trip, some time before and was refused.

Does the bridge foreman draw as much as the conductor? How do their duties compare? A readjustment of the wage question is necessary—not to give the trainmen more wages but to take some away and give it out in dividends to stockholders, if the company does not think the section foreman or the concrete laborer or bridgeman entitled to an increase over what they are now getting. Let us "side track" cataclysm referred to by "Operating Officer" and bring about fair treatment of all.

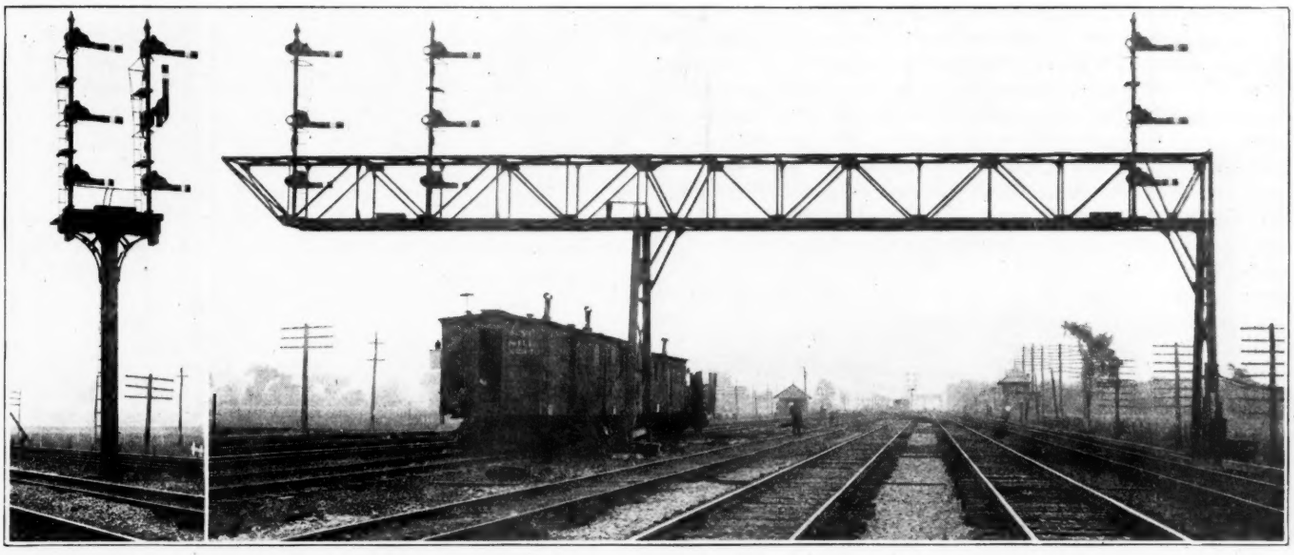
Ass't Engineer Bridge & Buildings.

Electric Interlocking at Rome, New York

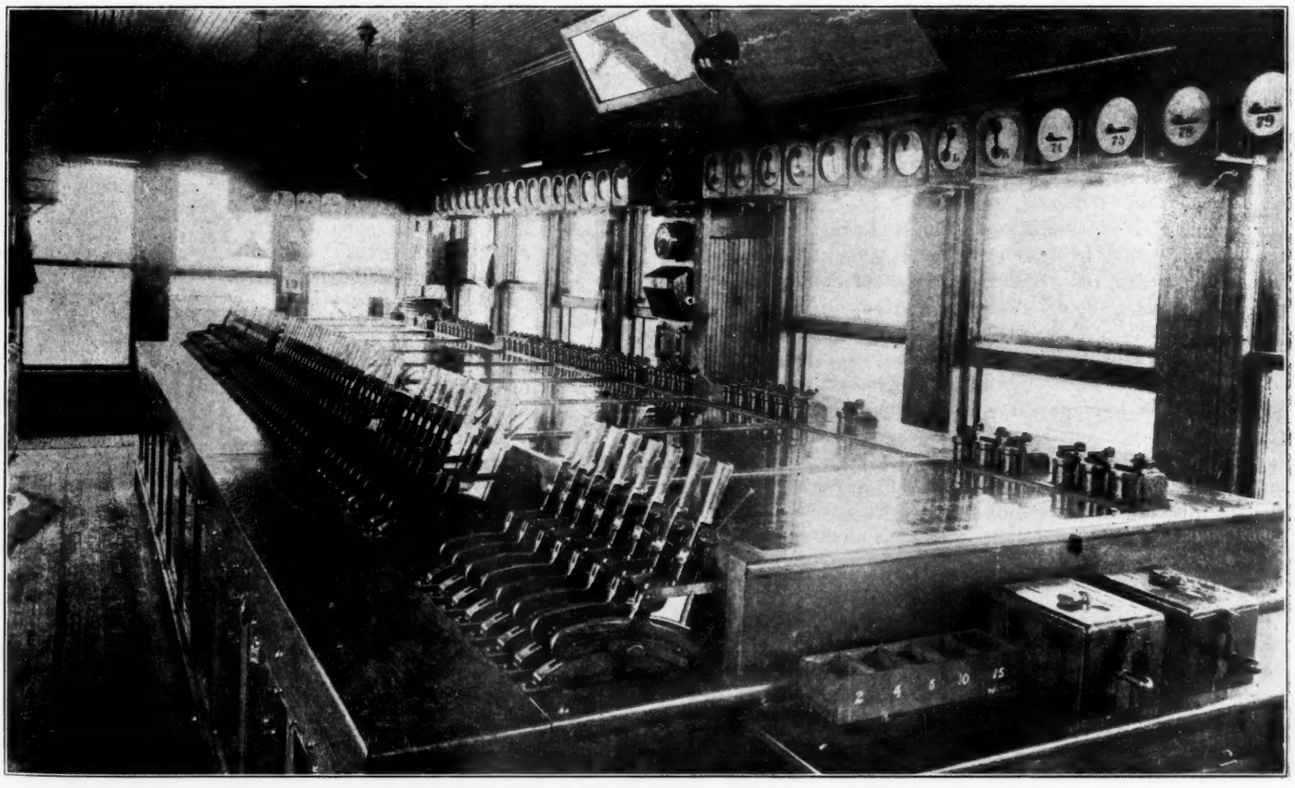
Speed Conditions Required No. 14 Turnouts. Restricted Track Centers Necessitated Special Signal Supports

At Rome, 109 miles west of Albany, the line of the New York Central & Hudson River expands from four tracks on the east to six tracks on the west. At this point, an 80-lever electric interlocking has been installed to operate the crossovers and turnouts. The improvements are on an entirely new line of road, which was built to eliminate two crossings with the New York State Barge Canal, as located, and which improvements were described last year in the *Railway Age Gazette* of August 15, 1913.

As the layout is to provide for high speed traffic, No. 14 crossovers are used throughout, and turnouts from the ladder leading to the fifth and sixth tracks are also No. 14. The use of these long turnouts makes the interlocking plant a long one. The speed restrictions through this interlocking are: Tracks



Bracket Post, Looking West; Cantilever Signal Bridge, Looking East



Federal All-Electric Interlocking Machine, Rome, N. Y.

1 and 2, maximum speed 40 miles an hour; tracks 3 and 4, maximum speed 20 miles an hour.

SIGNALS AND SIGNAL SUPPORTS

The cantilever signal bridge supporting the eastbound home signals for tracks 1, 4 and 5 is an interesting feature of this plant. The main part of the bridge spans tracks 1, 2, 3, and a siding, with one support outside of track number 1 and one between track No. 4 and the siding. The cantilever section projects over a second siding and also over tracks Nos. 4 and 5. The accompanying illustration shows this bridge and also the bracket post at the east end of the plant adjacent to track No. 3 supporting the westbound home signals for tracks Nos. 2 and 3 (signals 73, 74, 75, 77, 78, 79). These two special types of support were made necessary by the arrangement of track centers, and by the necessity for locating the foundations between tracks in such positions as to allow sufficient clearance.

The signals are three-position, moving in the upper quadrant. The high arms are the Federal Railway Signal Company's top post, 110-volt d. c. motor type and operate as semi-automatic non-stick signals. The dwarf signals are Style 4, Federal Railway Signal Company's design, the mechanism being exactly the same as that used in the top post signals; but when used in

New York Central Signal Station, Rome, N. Y.

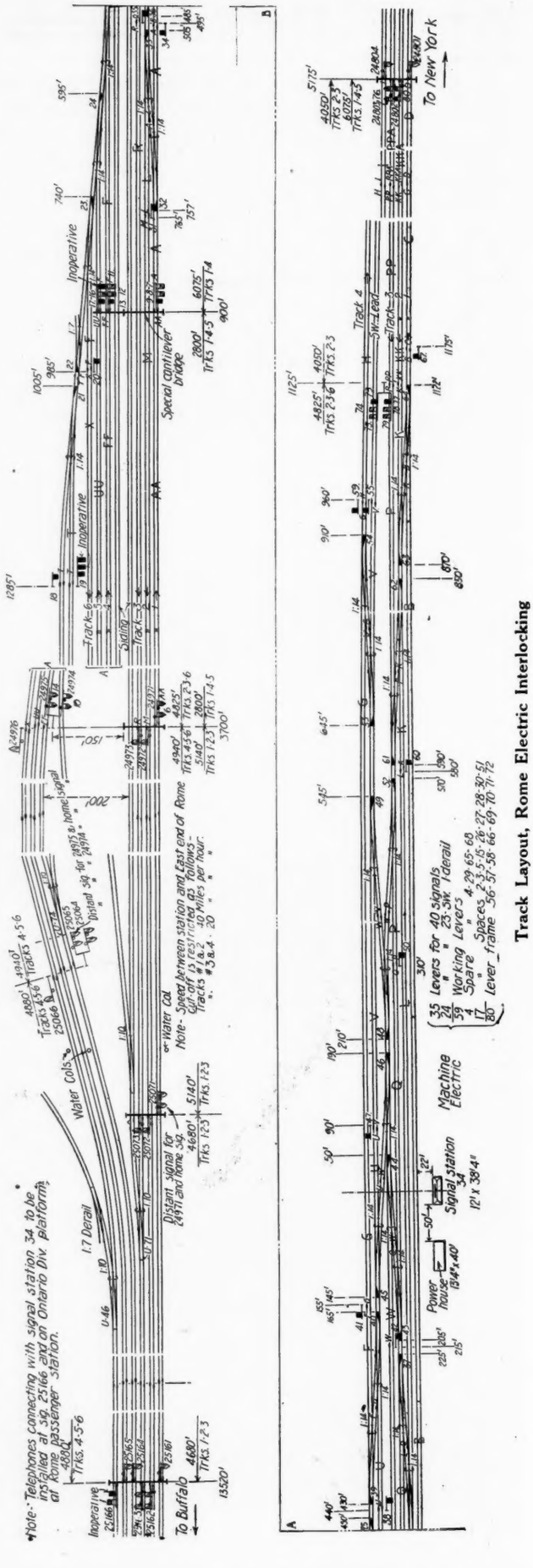
dwarf signals it is mounted on cast iron supports, which are bolted directly to concrete foundations.

All signals are electric lighted, the current used being 100-volt d. c. Each light has two 2-c. p., 100-volt carbon lamps. In case the first lamp fails to light or is burnt out, a cut-in relay completes the circuit to the second lamp. Night indications are green for clear, yellow for caution and red for stop.

The interlocking machine is of the Federal Signal Company's standard type, and has 59 working levers, 4 spare levers and 17 spare spaces, in an 80-lever frame. Thirty-five levers operate 40 signals and 24 levers operate 23 switches and 1 derail. This plant has but one interlocked derail, that on the ladder track leading to track No. 6 at switch 23. The complete outfit of crossovers provides diverging tracks for any and every movement which convenient and safe block signaling may make necessary; and derails, as substitutes for diverging tracks, are not needed.

SIGNAL CABIN

The signal tower, 12 ft. by 38 ft. 4 in. outside dimensions, is a two-story frame structure set on a concrete foundation. The lower floor contains the hot water heating plant and the relay track. The second floor contains the interlocking machine, the operating board, a group of unit type indicators strung across the top of the windows, and the operator's table. In the relay track on the lower floor there are 112 wall type glass-enclosed relays of the Hall Switch & Signal Company's type.



Track Layout, Rome Electric Interlocking

POWER

Power is supplied to the power room at 220- 110-volts, three-phase, 60-cycles, transformed from a 2,200-volt a. c. high tension transmission line of the Rome Gas & Electric Company, which is converted to d. c. by a mercury-arc rectifier and a motor generator set; the former for the indicator, interlocking and local track battery and the latter for track batteries in automatic territory outside the interlocking limits. The switchboard arrangement is such that the local track batteries, one of the duplicate six-cell batteries, and the main battery may be charged either separately or in series in any combination. Overload and reverse current circuit breakers are provided to protect against excessive charging or a reversal of power from the battery.

In addition to the ordinary rectifier equipment, a resistance is provided which may be cut in when operating the interlocking direct, in case of failure of the battery. This resistance has an increased tube capacity to take care of the heavy current rushes incident to the simultaneous movement of several switches or signals. The motor-generator set consists of two separate two-bearing machines mounted on a common base, connected by a flange coupling. The motor is of the three-phase induction type, 15 h. p., 1,800 r. p. m., 220-volts, 60 cycles, and the generator is shunt wound, 10 k. w., 600-volts, d. c.

The storage battery has a capacity of 400 a. h. and is located in a separate room of the powerhouse. The main battery stands on shelves at the sides of the room, while the low voltage and track batteries occupy a space in the center of the room. The low voltage and track batteries have a capacity of 120 a. h. The storage battery consists of 34 cells in duplicate, feeding 17 track circuits. The powerhouse is heated from the hot water plant in the tower.

Wooden trunking above ground and vitrified tile below ground are used for carrying wires. Loricated conduit is used in the powerhouse. Concrete relay box posts were used wherever necessary.

THE DIAGRAM

The automatic signals are indicated in the drawing by numbers which explain distances and track numbers. For example, signal No. 24803, at the east end of the plant, is 248.0 miles from New York, and is for track No. 3. At the other end are signals 251.6 miles from New York for tracks 1, 2, 3, 4, 5 and 6. The interlocked switch farthest from the machines is No. 64, in track No. 1, which is 1,122 ft. east of the tower. The letters on the tracks are used to identify the track circuit sections.

The tracks were laid by the engineers of the New York Central & Hudson River, and the signal equipment was installed by the Federal Signal Company. In November the railroad company called upon the Federal people for a quick job, so as to make it possible to open the new line by January 1; and, responding to this call, the manufacturers installed the whole of the interlocking in 41 working days. Much of the time the temperature was around zero. Many of the men worked extra hours, at times, and a small night force was organized.

ATLANTA, FOURTH TELEGRAPH CENTER.—A telegraph authority says that Atlanta is the fourth largest telegraph center in the United States. For the past four months the Western Union has handled in Atlanta an average of 1,080,238 messages a month, of which 191,792 originated in Atlanta. The traffic department is composed of thirteen supervisors, 210 operators and forty-four clerks. With the other departments there is a total of 339 employees in the main office proper, eighty messengers and thirteen branch offices. The payroll runs about $30,000 monthly.

RAILWAY CONSTRUCTION IN PORTUGUESE EAST AFRICA.—The engineer in charge of the proposed Mozambique-Nyasaland has been authorized to spend some $185,000 on commencing work. The line will be about 342 miles long, of which 62 miles will be in British territory and will extend from Mozambique on the east coast of Portuguese East Africa inland to British territory to the west. The cost is estimated at about $17,500 per mile.

CONVENTION OF TRAVELING ENGINEERS' ASSOCIATION

The twenty-second annual convention of the Traveling Engineers' Association was held at Chicago, September 15-18, President F. P. Roesch, presiding. The convention was opened with prayer by Dr. Samuel Fallows. J. F. DeVoy, assistant superintendent of motive power, Chicago, Milwaukee & St. Paul, called attention in an address to railroad conditions in this country, showing how earnings have declined, wages increased and freight rates decreased. He also compared shipments of staple commodities this year with those of last year, showing the decrease in business, and urged associations of this kind to take active interest in these affairs and exert all the influence possible to better conditions. Mr. De Voy also spoke of the development of the traveling engineer and his importance in railroad work; he must be capable of thoroughly instructing men and should ride with all those under his charge at least once every month. He should keep in close touch with conditions on the road, and with the train despatchers.

President Roesch in his address advised everyone to make the best of the conditions imposed on the roads by the commissions and to educate the enginemen along the lines designed to bring the best out of such improved devices as brick arches and superheaters. He stated that the mental qualifications should be raised for new men, and firemen should be under constant training for the position of engineman. He considered that greater intelligence is necessary to operate the large power of today than the small power formerly used. Enginemen should report engine defects thoroughly, as he considered that they would find more than terminal inspectors.

SMOKE PREVENTION

In order to eliminate dense black smoke, three conditions must exist, viz., to supply the fire with sufficient air, to thoroughly mix the combustible gases and air, and to maintain the temperature in the firebox to cause the combustible gases and oxygen of the air to unite. In stationary practice this is much easier to accomplish than in a locomotive. It is found that inadequate draft is usually responsible for smoky chimneys; therefore it is evident that it is necessary to have a properly designed front end, including the exhaust nozzle, ample grate opening and ash-pan opening large enough to insure free access of air. Grate opening is more generally found to be restricted by failure to clean clinkers from between the bars than by faulty design. Trouble is sometimes caused in properly designed from ends, by air leaks in the smokebox. The effort to overcome fires along the right of way has resulted, to some extent, in restricting the air opening in the ashpan. The ashpan openings are frequently permitted to fill up with ashes, especially in winter on account of freezing.

The brick arch is a great aid in smoke elimination, as it increases the travel of the gases and gives them a chance to combine with the oxygen of the air before coming in contact with the comparatively cool firebox sheets. When fresh coal is applied, the steam jets, beside giving a small mixing effect, are helpful in furnishing the necessary air over the fire. Special effort should be made to furnish a uniform grade of coal because it is hard for the best fireman to obtain the best results with a grade of coal which is continually changing. Better results will be obtained if an inferior grade of coal is furnished at all times, because where it is changed frequently the locomotive is drafted to burn the inferior grade and the better grade is wasted. In regard to the relative cost of fuel in connection with smoke elimination, it has been proved beyond reasonable doubt in stationary practice that where plants have been remodeled to overcome smoke a saving in fuel and increased efficiency have resulted. In locomotive practice the same results have been obtained where the smoke-preventing devices have been judiciously used, but to obtain these results constant watchfulness is necessary.

Locomotives must be maintained in good shape at all times

to enable the crews to eliminate smoke. Of course this costs money, but it pays in the long run on account of the efficiency obtained when this is done.

The question is frequently asked: "Why do railroads in this country fail to control the smoke problem as well as they do in European countries?" A communication from F. R. Wadleigh, of the firm of Wadleigh & Osborn, consulting engineers, Philadelphia, shows that conditions are entirely different in Europe and much more favorable for smoke elimination. The following is taken from his letter:

"In the first place, it must be remembered that the European railways pay much more attention to firing than we do; their men are more carefully instructed, the observance of proper methods is strictly enforced, and every appliance is made use of that will decrease fuel consumption.

"Then, they are much more particular as to size of coal used. For instance, on the French railways, each class of service has its locomotive fuel carefully divided as to lump and slack or briquettes and slack, by weight; passenger service uses 20 per cent slack and 80 per cent lump or briquettes; fast freight, 40 per cent slack; yard engines, 80 per cent slack, etc.

"Large quantities of briquettes are used. The following contracts were placed in 1912 by the Paris, Lyons & Mediterranean Railway, the largest in France: The total amount used is 1,830,000 tons, of which 600,000 tons was imported from England, Germany and Belgium; ninety thousand tons large Welsh Monmouthshire steam. This is all double screened coal running about 25 to 29 per cent volatile. One hundred and forty thousand tons Welsh smalls; this is for making briquettes. Volatile, 13 to 15 per cent. Sixty thousand tons German smalls for making briquettes; will run about 28 to 30 per cent volatile. These two coals mixed in briquettes giving about 20 per cent volatile. Sixty thousand tons German briquettes. One hundred thousand tons Burham coking unscreened; will run about 23 to 27 per cent volatile. This is used as slack without briquettes. The specifications require:

"First: Coal must not produce adherent clinkers.

"Second: Ash—large Welsh, 6 per cent; smalls, Welsh, 9 to 13 per cent; briquettes, 8 to 10 per cent.

"Third: Large steam coal must contain from 25 to 35 per cent volatile substance and the smalls and patent fuel (briquettes) about 20 per cent."

Mr. Wadleigh's letter indicates that the use of briquettes is a large factor in the elimination of smoke from European railroads, but the cost of a good grade of coal is so small in this country as compared to the cost of briquettes that their use here is prohibitive.

The report is signed by Martin Whelan, chairman; A. M. Bickel, P. K. Sullivan, W. A. Heath and B. J. Feeny.

Discussion.—The discussion brought out that without the proper instruction and conscientious co-operation of engine crews, smokeless firing cannot be expected even though locomotives are equipped with efficient smoke consuming devices. Engines must also be correctly designed, with not less than 90 per cent ashpan air openings and 46 per cent openings in the grates. Brick arches were strongly recommended by E. W. Pratt, Chicago & North Western, for use on all engines. One member reported 20 per cent saving in fuel by increasing the ashpan openings.

CARE OF LOCOMOTIVE BRAKE EQUIPMENT

The care of locomotive brake equipment on the line is a question in which the engineman, trainman and car inspector are concerned. The engineman is concerned regarding the complete equipment, the trainman in regard to the proper handling of the angle and cutout cocks, hose and also the use of the retaining valves, all efficient brakes, and to see that the brake pipe leakage is kept as low as possible at all times. The car inspector is concerned as to the brake pipe leakage and the general condition of the train brakes. With the increase in the weight of locomotives and tenders it is necessary that the braking power be maintained at its maximum efficiency in order to reduce draft gear strain, liability of wheels sliding, and to provide smooth handling of trains in so far as possible. The engineman should be responsible for properly inspecting and caring for the air brake apparatus while it is in his charge, or for the proper reporting of all existing defects on the arrival at terminals. The committee is unanimously of the opinion that the brake equipment should be tested and inspected by the repair men at the terminals, and correct the defects without waiting for the report of the engineman. On one of our large roads the official in charge of mechanical matters has recently issued instructions that the compressors and other air brake equipment on freight and passenger locomotives should be tested each trip before the locomotive left the roundhouse for the train and by so doing has reduced the air pump failures from 231 in 1912, to 123 in 1913.

The committee also included in its report complete instructions for testing air brake equipment, together with instructions for repairing the various troubles. The report is signed by George H. Wood, chairman, B. Hyanes, R. E. Anderson, W. V. Turner, E. Bales.

ADDRESS BY H. C. BAYLESS

H. C. Bayless, mechanical engineer, Minneapolis, St. Paul & Sault Ste. Marie, in an address called attention to the increasing importance of the traveling engineer, especially in investigation work connected with new locomotive devices. He also said that there is a large field for them in increasing the efficiency of operation.

The balance of the proceedings of the convention will be published in next week's issue.

THE DUTIES OF A STATION AGENT*

By R. Morgan
General Manager, Savannah & Northwestern

The general term "agent" as applied to men in the service of railroads, covers a multitude of duties. An agent must be a diplomat. He must know when to assume a stern and uncompromising manner, and also when to be gracious and appealing in his attitude towards his patrons. He must have at his command a regular bureau of information for the benefit of the public, and be fully able to forecast future weather conditions, as well as keep well posted concerning the conditions of the market, and when to sell a clergy ticket to a preacher. He should also acquire early in his experience as an agent the art of carrying from the train the pouch of United States mail, the bundle of railroad mail, from three to five suit cases, the package of express bills, pulling at the same time a truck of express, and in passing consult his watch and give the correct time to Old Man Jones, who in all of his life never had occasion to hurry, except to get a drink of ice water before the train pulled out from the station.

In other words, as a rule, an agent is usually the sole representative of the company at his station. It is up to him to see that his company is well represented. If the agent makes for himself a good reputation with his patrons, he likewise strengthens the reputation of his company, as the company is always governed by his representations concerning matters pertaining to its business and patrons at such stations. The agent is on the ground and can form more accurate conclusions regarding all matters concerning the company's affairs there, than can be formed by others at a distance. He is in close touch with conditions as they exist, and therefore must be the source of the company's information, and his influence has everything to do with the current opinion existing in reference to the company.

Along this line it is well to mention the benefits to be derived from the sociability of the agent. By this, it is not meant that he should be sociable with those whose society would be distasteful, but his disposition should be such as to reach as many people

*Address at Station Agents' Meeting, Savannah, Ga., on August 16.

as possible, making them feel that they have a friend and a neighbor, who will go to trouble to accommodate them, giving them the benefit of such privileges as are due them, and one who will ably and gladly represent them in their business relations with the company. Much competitive business is secured by agents of such amiable disposition, which after all redounds to the good and credit of the agent. It increases the amount of business at his station, it increases his worth to his company, and will in time make his services sufficiently valuable to warrant the company in giving him promotion which he has really earned.

Personal neatness on the part of an agent is also to be commended. It has its effect on old neighbors as well as strangers to come into your office and find everything in orderly and systematic array, showing signs of having recently had a touch of a feather duster, floors clean and walls minus spider webs. Neat station grounds will always attract the eye of the passenger passing through on the train, and may possibly have some effect, in some instances at least, in inducing people to locate in your town. It is not always things of much magnitude that influence the casual observer, but sometimes little things have far-reaching effects, and bring about results astonishing in view of the minute circumstances to which their origin is due. Therefore, do not wait until opportunity presents some great thing for you to do, but perform the little duties, the little things that come up day by day. The result will be gratifying, and it is certain you will not have to grow old awaiting your opportunity.

It is well also for agents to benefit from observation. It is not meant by this assertion that the agents are the only class of employees who could be benefited through means of observation. Each class of employees could become more efficient if they would observe closely the methods and plans of others in the same line of work. If you observe a method of billing cotton by another agent, that you are sure is an improvement over the method you have previously used, it is the better part of judgment to adopt the same method. Or if you observe the loading of merchandise by some particular agent is an improvement over your method, you will benefit by adopting the same method. If you find that the local freight train by following certain modes of procedure in doing your yard work could thereby save time, and at the same time reduce the amount of work to be done, make up your switch list so as to accomplish this end. Unless you observe closely the switching as performed in your yard, you can hardly hope to be instrumental in improving the service.

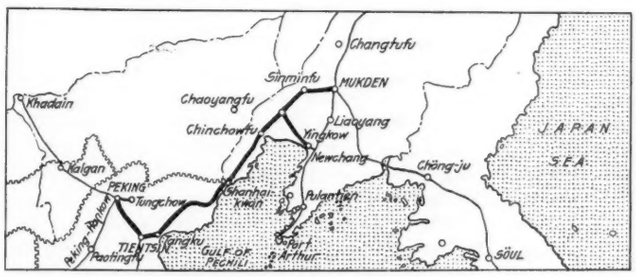
"Safety First" has been extensively preached to trainmen and all employees in yard service, but very little has been said in reference to this matter to agents. "Safety First" cannot mean more to engineers and conductors than it means to an agent. You can be the means of preventing many accidents in the course of a long term of service. Leaving express trucks too close to the tracks oftentimes results in personal injury accidents. This, you can prevent, by keeping a watchful eye on the parties handling the trucks. The agent is probably the only one who can prevent improper loading of inflammables and explosives, which otherwise might result in serious accidents. It is hardly necessary to call attention to what "safety first" means with reference to train orders. When the despatcher calls you to take an order for a superior train giving certain rights to an inferior train, the superior train then being due at your station, "safety first" would mean that you should put out your signals to the superior train, indicating that you have orders for it. This, of course, should be done before you take the orders; otherwise the train might possibly get by you, and the result be a serious accident. These are only a few instances of "safety first" as referring to agents. There are many others.

Next to "safety first" agents would do well to consider "self protection first," which in almost every instance would also mean company protection. The interests of the agent are so closely allied with those of the company, that the protection of one invariably means the protection of the other. For instance, if an agent signs a bill of lading for a car of lumber before ascertaining that it is properly loaded for transportation, he fails to protect himself or the company, and the lumber is adjusted or reloaded at the expense of the company, and the agent is open to criticism and reprimand from his superior officer. Or if an agent signs a bill of lading carrying the endorsement "Shipper's Load & Count" for a shipment less than carload and the shipment checks short of the number or quantity shown, then the agent does not protect himself or the company, for less than carload shipments should not be accepted as "Shipper's Load & Count," but should be checked by the agent before issuing bill of lading. These are only a few of the instances of "self protection" and "company protection" on the part of an agent. There are many other instances, and all agents should always exert their uttermost efforts towards such protection.

The manners and general behavior of visitors at the station should also come under the observation of the agent. It is a matter of history that many people congregate around the depot who would not be welcomed in ordinary good society, and unless it is compulsory, their behavior would not be becoming in the presence of ladies and gentlemen. This is where the agent must be the diplomat, and if necessary put on the stern and uncompromising manner already referred to, in seeing that such visitors conform to the demands of decent society. This will not only meet with the approval of the better element of your patrons, but will greatly add to the respect accorded you by the other element.

RAILWAY CONSTRUCTION IN HONDURAS.—The construction of several new lines in Honduras was started in 1913, and it is expected that the work will be pushed to completion in the near future. The Tela Railroad is building a 90-mile line from Tela to Progreso, through the banana lands along the Ulua river valley; about 10 miles of this line has been completed, and a 2,000-ft. wharf is to be built at Tela. This company is also building a line to be about 15 miles long, to Colorado, where connection is to be made with the line now in operation from a point 20 miles up the Lean valley. The Tropical Timber Company has in operation about five miles of railroad and will build 10 miles additional into a timber section.

THE PEKING-MUKDEN RAILWAY OF CHINA.—The Peking-Mukden railway, formerly known as the Imperial Railways of North China, earns the greatest revenue of any of the Chinese government railways. The principal part of the railway was completed in the early nineties. The main line extending from



The Peking-Mukden Railway

Peking to Mukden is 522 miles long. The principal branch, to Newchang, is 57 miles in length and there are other small branches which make up the total of 606 miles. Sidings are numerous, totaling 148 miles, and extensions of the line have been proposed, aggregating 180 miles. The line for the most part is built in easy country. The sharpest curve has a radius of 1,000 ft., and the heaviest grade is 0.9 per cent, but occurs in a few short lengths only. The weight of rails from Peking to Tongshan is 85 lb., but from Tongshan to Mukden it is only 60. The ties are of Japanese hard wood. The line has no competing railroad, and it is said that rates on it are high and that facilities are not of the best. By means of the railway it is possible to travel from Peking via the Trans-Siberian to Europe.

TRAIN ACCIDENTS IN AUGUST[1]

Following is a list of the most notable train accidents that occurred on railways of the United States in the month of August, 1914:

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of train.	Kil'd.	Inj'd.
*†5.	Kansas City So.....	Tipton Ford, Mo.	bc.	P. & P.	39	30
15.	N Y. N. H. & H....	New London.	xc.	F. & F.	1	1
23.	Mo. Kan. & Tex.....	Smithville.	bc.	P. & P.	0	8
30.	Atlantic C. L.....	Fayetteville.	xc.	P. &. F.	0	5

Derailments.

Date.	Road.	Place.	Cause of Derailm't.	Kind of train.	Kil'd.	Inj'd.
3.	Pitts. & L. E.....	Beaver Falls.	b. flange	F.	1	2
12.	Southern	Tuxedo.	d. switch	P.	1	6
13.	Tenn. Central	Mount Juliet	unx.	P.	0	11
25.	St. Louis & S. F....	Kelleyville.	d. track	P.	0	35
28.	Kansas C. So.....	Marble City.	b. rail	P.	0	12
29.	Lancaster, O. & S...	Tweedale, Pa.	.....	F.	0	3

The trains in collision on the Kansas City Southern near Tipton Ford, Mo., on the fifth were a northbound passenger of the Kansas City Southern and a southbound passenger of the Missouri & North Arkansas, the latter consisting of a single car, a gasolene motor. Thirty-six passengers and three employees were killed, all of them on the southbound train; and twenty-seven passengers were injured. It is possible that other persons were killed, the bodies of some being so badly burned that identification was impossible. The cause of the collision is given as disregard of a meeting order by the men in charge of the southbound train. They should have waited at Tipton Ford. This accident was reported in the *Railway Age Gazette* of August 7 and August 14.

The train involved in the collision at New London, Conn., on the 15th was a switching freight. The engine was run into at the side by a string of empty passenger cars and four cars were wrecked. The fireman was killed and the engineman injured. The cause of the collision was negligence in switching operations.

The trains in collision on the Missouri, Kansas & Texas, near Smithville, Tex., on the 23rd, at about 3 a. m., were passenger trains Numbers 1 and 2. The southbound train, No. 1, had been brought to a stop. Both engines were badly damaged and five passengers and three employees were injured. The collision was due to an oversight on the part of the despatcher. He had given these trains an order to meet at Kirtley, five miles south of Smithville, and subsequently annulled this order; but the annulling order was not sent to train No. 1.

The trains in collision at Fayetteville, N. C., on the 30th were a passenger and a freight, both of the Atlantic Coast Line; passenger No. 85 ran into the freight at a crossing of two tracks, the main line and the Yadkin branch, and two freight cars were wrecked. Three passengers and two trainmen were injured. The cause of the collision was disregard of signals on the part of the passenger train.

The train derailed near Beaver Falls, Pa., on the morning of the 3rd, was an eastbound freight and six cars were wrecked. The cause was a broken flange. Three trespassers were injured, one of them fatally.

The train derailed at Tuxedo, N. C., on the 12th, was an excursion bound for Asheville, and the locomotive was overturned. The fireman was fatally scalded and six passengers were injured. The accident was caused by a broken switch rod.

The train derailed on the Tennessee Central, near Mount Juliet, Tenn., on the 13th, was an eastbound local passenger; two passenger cars fell down a bank and nine passengers and two trainmen were injured. The cause of the derailment was not discovered.

The train derailed near Kelleyville, Okla., on the 25th, was passenger No. 408. Four cars ran off the track, but remained upright. Thirty or more passengers were injured, but none seriously. The cause of the derailment was a low joint, and this appears to have been due to water which had accumulated in the ballast because of imperfect drainage, aggravated by heavy rains. The train was running about 45 miles an hour on a straight line, and the tender was the first vehicle to jump the rail.

The train derailed near Marble City, Okla., on the 28th, was southbound passenger No. 1, and the mail car and first two passenger cars were overturned. Twelve passengers were slightly injured. The cause of the derailment was a broken rail.

The train that was derailed on the Lancaster, Oxford & Southern, near Tweedale, Pa., on the 29th, was an eastbound mail train, consisting of a single gasolene car. Three men were injured. The derailment was due to a pile of stones on the track, believed to have been placed there maliciously.

[1]Abbreviations and marks used in Accident List:

rc, Rear collision——bc. Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

THE PRESIDENT'S RESPONSE TO THE RAILROADS

President Wilson, responding to the appeal presented to him by the committee of railroad presidents last week (*Railway Age Gazette*, page 462) sent to Chairman Trumbull, on Thursday, the following reply:

"Since you read it to me yesterday, I have read again the statement you made me on behalf of the committee of railroad presidents whom I had the pleasure of meeting and conferring with at my office. It is a lucid statement of plain truth.

"You ask me to call the attention of the country to the imperative need that railway credits be sustained and the railroads helped in every possible way, whether by private co-operative effort or by the action, wherever feasible, of governmental agencies, and I am glad to do so, because I think the need very real.

"I cannot say that I entertain any deep anxiety about the matter, except, of course, the general anxiety caused by the unprecedented situation of the money markets of the world; because the interest of the producer, the shipper, the merchant, the investor, the financier and the whole public in the proper maintenance and complete efficiency of the railways is too manifest. They are indispensable to our whole economic life, and railway securities are at the very heart of most investments, large and small, public and private, by individuals and by institutions.

"I am confident that there will be active and earnest co-operation in this matter, perhaps the one common interest of our whole industrial life. Undoubtedly men, both in and out of official position, will appreciate what is involved and lend their aid very heartily wherever it is possible for them to lend it.

"But the emergency is, in fact, extraordinary, and where there is a manifest common interest we ought all of us to speak out in its behalf, and I am glad to join with you in calling attention to it. This is a time for all to stand together in united effort to comprehend every interest and serve and sustain it in every legitimate way.

"The laws must speak plainly and effectively against whatever is wrong or against the public interest, and these laws must be observed; for the rest and within the sphere of legitimate enterprise, we must all stand as one to see justice done and all fair assistance rendered, and rendered ungrudgingly."

NEW MILEAGE OF BRAZILIAN RAILWAYS.—During 1913 the railways of Brazil put in operation 1,438 miles of new lines, making a total of 15,246 miles now in operation, of which 2,185 miles are government lines, 5,716 miles privately leased roads, 3,447 miles granted to various enterprises by government concessions, and 3,897 miles operated by private corporations under state concessions.

Annual Meeting of Master Painters' Association

Discussions on the Finishing of Steel Passenger Cars, Standard Freight Car Lettering, and Apprentices

The forty-fifth annual convention of the Master Car and Locomotive Painters' Association was held in Nashville, Tenn., September 8 to 11, Oscar P. Wilkins, master painter of the Norfolk & Western, presiding. The opening prayer was made by Mr. Spain, secretary of the Nashville Y. M. C. A., after which the association was welcomed to the city by W. S. Mitchel, chief of factory and shop inspection for the state of Tennessee. He was followed by Mattison Wells, secretary to the Mayor of Nashville.

PRESIDENT'S ADDRESS

President Wilkins spoke of the value of these annual conventions, and called upon the members to co-operate in the exchange of ideas, as without this the association could not hope for success. The master painter should be progressive, seeking to increase the efficiency of his department. Attention was also called to the necessity of developing young men in the painting trade who will be called upon later to take charge of departments.

TEST COMMITTEE'S REPORT

In order to successfully cope with the ravages of rust on steel equipment the designer must lend a helping hand providing a construction that it will be possible to protect. The rain guard on cab roofs has been found difficult to protect properly as it catches dust and cinders from the locomotive, which, with moisture, forms an acid that will penetrate the paint. The protection of steel under-frames of tenders and cars is also a greater question than even the steel cab, and a careful study should be made with a view of providing an absolutely protective paint. An elastic paint film is necessary to stand the vibrations the equipment receives in railroad service. When red lead is used a pigment should be used that has a tendency to minimize the oxidizing influence of this material. When mixing paint for the second or protective coat of the primer, the facts that linseed oil will absorb moisture, and that all vegetable oils are readily attacked and disintegrated by sulphurous and other acids, must be taken into consideration.

From tests made by the committee in different parts of the country it was proved conclusively that the baking process retains the lustre of the varnish, and is more free from checks than the air-dried plates. The report was signed by J. W. Gibbons, chairman, H. Hengeveld and A. S. Baldwin.

FINISHING STEEL PASSENGER EQUIPMENT

J. B. Wright (B. & O.): While it has been found that the baking oven has given very good results in painting steel equipment, it is believed that it will not be universally used on account of the expense of painting the equipment in this manner, especially in establishing the plant. This process also eliminates the opportunity for doing other work on the cars while they are being painted. While this is very advantageous from the painters' standpoint, it will require holding a car for a longer time. The surfacers used in painting steel equipment are of great importance. They must be inhibitive and elastic. In order to decrease the number of necessary coats applied a smoother metal surface must be provided by the metal workers. The decks, deck screens and roofs of the steel passenger equipment cars are causing the greatest trouble. These parts should be well painted when the cars are built and carefully watched while in service, repainting as often as necessary for their protection. Our road has adopted the practice of sprinkling sand in the last coat of paint on the roof in order to eliminate the trouble caused by hot cinders which fall thereon, burning and destroying the paint coating. It is believed that the use of plain colors for finishing the interior of steel cars will be found very much more practical and economical, as with the grained finish it is difficult to repaint parts which frequently become scratched or chipped.

Discussion.—A. J. Allen (D. L. & W.): The most essential part of painting begins with the man who inspects the cars while they are being built. The greatest care should be exercised in seeing that every concealed part is well painted with some good, elastic paint and all joints, especially, should be red leaded, for I do not think that anything has as yet been discovered to take the place of red lead. I have also found that the cement or paste used to apply the insulation to the car sheathing will eat the life out of the paint, and allow the sheet to rust. On the same car where the cement had not been applied the paint was in splendid condition.

The roof and deck are also very important. The paint should be carefully applied and the surface thoroughly cleaned before painting as this will save an endless amount of trouble. Where it is possible, every sheet that goes on the roof should be sand-blasted and primed with red lead immediately after it has been cleaned with the sand-blast. Red lead has given us the best results as a primer. It is also a good plan to sand on top of the paint as it prevents the hot cinders from making holes through the paint to a certain extent. We do not sand the entire roof, but simply the parts most exposed to the flying cinders. We have experienced no trouble in painting or taking care of the body of the car if it is painted according to a system and the proper amount of care taken in applying the different coats. I do not think that a steel coach should be painted in less time than 22 days, although with some elastic paint good results may be obtained in a much shorter time, but the number of coats should not be curtailed.

From the discussion the consensus of opinion seems to be that the metal should first be carefully prepared by having all rust and dirt, grease, etc., removed from it, and then apply carefully a coating of proper thickness and maintain it properly, not at the regular shopping, but at certain times throughout the year, keeping the paint well ahead of the rust and not allowing it to get too thin on account of wear.

INTERIOR WOOD FINISH FOR PASSENGER COACHES.

F. E. Breese (L. S. & M. S.): Almost the entire passenger equipment of the Lake Shore & Michigan Southern is finished in mahogany color. On receiving a new car from the shops the surface is carefully sanded and cleaned, and is then stained to our standard shade. It is then covered with a coat of paste filler tinted to the same standard shade. After the paste filler has been applied the surface is alternately sanded and covered with a coat of rubbing varnish three times, and finally a fourth coat of rubbing varnish is applied. After this the surface is rubbed with water and pulverized pumice stone. The average shop time for finishing a coach is about 19 days.

Mr. Breese closed his remarks by outlining in detail the method of handling the headlinings, the saloon, doors, sashes, seat arms, etc.

A. R. Given of the Canadian Pacific presented a paper explaining the methods used in finishing colonist, tourist, suburban, first class, sleeping, dining, observation and parlor cars. In the colonist and tourist cars birch is used for finish. Mahogany is used in the suburban and first class cars, and also in sleeping, dining, observation and parlor cars. Mr. Given went into the details of finishing these cars, laying particular stress on the headlining.

J. McCarthy (G. T.): Our natural wood finish consists of

corn starch made with pure linseed oil to a semi-paste form with a quantity of sienna and other staining colors to give the required shade. This filler is thinned with benzine to a working consistency. An interior wood finish that is well filled with the required color and the necessary staining, shading, toning and blending, covered with two coats of good white shellac and three coats of good pale rubbing varnish, will when rubbed down or polished with pure raw linseed oil or renovator produce a rich, silky appearance, and good, permanent results will be obtained.

(Mr. McCarthy also included a more detailed description of the practice followed at the Montreal, Que., shops.)

PAINT SHOP APPRENTICE SYSTEM

B. E. Miller (D., L. & W.): The painters' apprentice system has been in effect on the Lackawanna for 15 years. Schools of instruction have been maintained at Kingsland, N. J.; Scranton, Pa., and Buffalo, N. Y., for the past four years. The apprentices are entered between the ages of sixteen and eighteen, and the average age is 16½ years. A four-year course is prescribed for the painters as in the other trades, a total of 10,000 hours being required before a diploma is issued. The rate of pay is advanced at the expiration of every 2,500 hours as follows: First period—8.5 cents per hour; second period—11.5 cents per hour; third period—15 cents per hour; fourth period—18 cents per hour. Upon the recommendation of the apprentice instructors, the general foreman and other officials, a diploma may be granted after serving three years of 2,500 hours each, if it is believed the apprentice is capable of earning a mechanic's wages.

No hard and fast rule is followed as to the assignments and periods of service in the various classes of work into which the four year term is divided. In general six months is given to the following work: General locomotive work; varnish room work; general work on the floor; body work and surfacing; interior finishing; general work and glass painting; striping and lettering; and the last six months' work is governed by conditions. Piece work is allowed in the fourth year.

It has been found particularly difficult to secure good material for paint shop apprentices, the other trades seeming to draw the more desirable applicants. Of the men that have taken the paint shop course 25.35 per cent. of all apprentices employed during 14 years are still in service. The greatest number leave during the first year of service, the percentage being 45.09. The percentage leaving the second year is 8.45, and for the third and fourth year the percentage is only 2.82 and 2.81, respectively.

Discussion.—It was believed that if more attention was given the paint shop apprentice in the apprentice school and elementary lessons in chemistry pertaining to paints and oils given in the place of other subjects they are now required to study which do not pertain to their trade, much better results would be obtained and a better class of boys could be interested in the work.

THE SAND BLAST AS A PAINT REMOVER

W. O. Quest (P. & L. E.): We are firm in the belief that the sand blasting method of cleaning metal or stone surfaces is the best, the most effective and the most economical to use. This preparatory cleaning must be figured upon regardless of cost in order to avoid making the costly mistake of painting over live corrosion or mill flash scale. If a sand blast system is properly installed and handled its work can be depended on for a maximum of service results. The average cost of removing paint, etc., from an 8,500 gallon tender tank by the sand blast is a fraction less than eight mills per surface foot, and the total piece work price is $3.33. The same tank cleaned with the best known non-dry-hardening caustic mixture, soluble in water, will cost $7.10, and even then the flash scale will not be wholly removed. The cost of chemically removing the flash scale, and of neutralizing the acid used is prohibitive. This leaves the sand blast as the only practical metal cleaning method that will provide a clean, inert surface to receive paint.

At the McKees Rocks shops all large sand blast work is done in an elevated track sand storage house. The sand used for blasting is used again for sanding locomotives. This also eliminates the trouble from dust in other shops. The sand blast can also successfully be used for glass ornamentation work, and is, in fact, superior to the acid method of cutting. There are, nevertheless, cases where the chemical removers can be used to much better advantage than the sand blast, especially on small castings, driving wheels, dome and sandbox base castings.

F. A. Weis (C. R. R. of N. J.): The sand blast not only removes the paint, rust and flash scale, but it leaves a roughened metal surface to which the paint will readily adhere. This not only better protects the metal surface, but gives a longer life to the paint. The cost of the sand blasting has been found to be cheaper than chemical methods.

Discussion.—The members were agreed that the sand blast gives much the best results, and is cheaper than other methods everything considered. The New York Central & Hudson River at the Albany shops have sand blasted a first class vestibule car in five hours with two men, but find that about 7½ hours is the average time. If a good silica sand is used it may be possible to use it over two and three times. Shot has not given satisfactory results on cars. The advisability of using the sand blast on the inside of cars was questioned by some members.

STANDARD FREIGHT CAR LETTERING

The standardizing of freight car lettering was strongly favored by the association, and many instances were mentioned where, on account of the lettering not being standard, considerable trouble had been caused. The following resolution was adopted in this regard:

"Whereas, The Master Car and Locomotive Painters' Association recognize the advertising value of the trade marks of the railroads that have been in use for years, and realize it would be useless for us to ask them to dispense with this invaluable medium of reaching the public, but

"Whereas, A uniform stenciling of freight cars is very desirable from the standpoint of shop efficiency and economy, and efforts have been made in the past, both by this association and by the M. C. B. Association, to accomplish this end, with more or less success; be it therefore

"Resolved, That we renew our efforts to arrive at this desirable end; and that we appoint a committee to design a series of letters and figures for this purpose, said committee to confer with the M. C. B. Association for its general adoption on all railroads."

OTHER BUSINESS

In considering the subject of the classification of repairs it was the consensus of opinion among the members that by classifying interior and exterior repairs separately a much more accurate estimate of the total cost could be made. The Pennsylvania Railroad has been using this system very successfully.

Other papers were presented on Rust Inhibitive Paint and Non-whiting Varnish for Locomotive Tenders.

The secretary reported a membership of 292.

The following officers were elected for the ensuing year: President, T. J. Hutchinson, formerly of the Grand Trunk; first vice-president, H. Hengeveld, Atlantic Coast Line; second vice-president, John F. Gearhart, Pennsylvania Railroad, and secretary-treasurer, Alfred P. Dane, Boston & Maine. Detroit received the greatest number of votes for the next place of meeting.

NEW RAILWAY TUNNEL IN INDIA.—Work is now under way on a 1,507-ft. tunnel for the Great Indian Peninsular Railway in the Western Ghats, about 100 miles from Bombay, India. The contractors are Pauling & Company, Bombay. Work on the tunnel was begun in December, 1913, and it is expected that the tunnel will be completed by July, 1915.

THE EUROPEAN WAR, THE SOUTHERN RAILWAY AND ITS EMPLOYEES

In the course of an address on Labor Day at Spencer, N. C., Fairfax Harrison, president of the Southern Railway, discussed as follows the effect of the European war on the Southern Railway, its employees and the people of the south:

We have on the rolls of Southern Railway Company a splendid body of employees. I am proud to say that, individually and collectively, our organization will compare most favorably for efficiency and loyalty with that of any other railroad system in the United States, be it north or south, east or west. In the broad sense of the word we are all employees. As the words are generally used the organization is composed of officers and employees, but the line between these two classes is not a barrier. Under the Southern Railway policy of filling vacancies in the higher grades by the promotion of qualified and loyal subordinates the line between employees and officers is constantly being crossed and in every department of the service there is a wide field for promotion. Like Napoleon's soldiers every one of us carries a field marshal's baton in his knapsack.

More than this: Aside from adhering to the policy which assures promotion so far as opportunity may arise, the management of the company believes that it has shown its appreciation of its employees by just, and even liberal, treatment in the matters of wages and conditions of employment. For all classes of skilled labor Southern Railway Company and the railways of the south are paying as high wages as any railroads in the United States and higher than many, especially those north of the Ohio and Potomac rivers and east of Chicago in territory where the density of traffic which creates railway revenue is much greater than along our lines. We have met most of the expectations of our employees and, were it possible consistent with our whole duty, we would be glad to meet them all. Nothing in my career has given me more profound and sincere satisfaction than to be connected with a company which has been able to advance so notably—as Southern Railway Company has done—the social welfare of the sturdy, hard working and faithful men who are its responsible employees, and I feel this whenever I have the privilege of shaking hands with and looking into the face of one of our older men—as I am always proud to do—a man who has known something of what conditions on the railroad used to be and what they are today. These older men have, themselves, largely made possible what we have been able to do for our employees generally and should have the credit for the advantages the younger men now enjoy almost without knowledge of where they came from. I look forward with confidence to the efficient and sustained loyalty of these men making possible still further improvement in their own condition and that of their juniors. We can not, however, accomplish this without regard to the business conditions which make a railroad a living thing.

While the element of danger can not be entirely eliminated from some kinds of railroad employment, the management of Southern Railway Company is constantly endeavoring to reduce this danger to a minimum and to safeguard its employees and the public. Accidents by which employees or others are injured are systematically studied with a view to installing such appliances or issuing such instructions as will tend to prevent them in the future. The best practice of other companies for the prevention of accidents is being closely studied in connection with our own initiative and every device and practice that is an improvement over what we already have is adopted so far as it is practicable for us to do so.

Our high level of wages and conditions of employment at least as favorable as substantially all of the other railroads in the United States were established at a time when the business of the company was normal and when there was reason to expect increased earnings rather than the reverse. Suddenly we find today that the entire situation as affecting the business of the company has been changed. Under the modern systems of world-wide exchange of commodities and of international credits, though the American people are at peace with all nations, the war in Europe has profoundly disturbed all lines of business in the United States and has brought about a curtailment of production and a consequent falling off in transportation, the full extent and duration of which no man can now predict with certainty. We know, however, that, although the war is being waged three thousand miles from our shores, its effects are being felt to a greater or less degree by practically every family in the United States. We also know that, unfortunately, the effects of the war are being felt in no part of the United States more seriously than in the south.

But a few weeks ago the south was looking forward after a winter of hesitating business to a season of unsurpassed prosperity. Rejoicing in having a substantial monopoly in supplying the world with cotton, the southern people were looking with satisfaction upon the bountiful crop maturing in the fields which they had every reason to believe would be sold at a remunerative price. When Europe plunged into war, because of the fact that a large proportion of the crop must seek foreign markets, the cotton monopoly of the south, instead of being a source of strength, became an economic weakness. The market for cotton was wiped out. Steps are now being taken by the federal government and by patriotic bankers to relieve the situation and prevent widespread bankruptcy and distress throughout the south. However successful these may be, they can afford only partial relief, for, excluded from foreign markets, a large proportion of the crop must be stored in the south and will not be offered for shipment for many months. The situation is made worse by the fact that the activities of American cotton mills are being hampered, not only by financial conditions, but also by inability to secure dyes which in the past have been supplied only by European countries involved in the war. Likewise southern farmers will have to restrict their acreage of leguminous crops this year, because of inability to secure supplies of seed from Germany and Austria. Looking forward to next year, we find that, unless the war shall be of short duration, the manufacture of some kinds of commercial fertilizers, which are an important article of freight for the railroads of the south, will be greatly restricted because Germany is the sole source of supply of potash.

Under present conditions and prospects in the south all lines of business have fallen off and railroad traffic and earnings are showing substantial decreases. We hope for the best and are doing all in our power to bring about improved conditions. We are continuing the extensive construction work for which, fortunately, capital funds were secured before the war began. The disbursement of this money in southern communities will be helpful, not only to the men employed, but to southern business enterprises generally. We realize that, with all the great manufacturing and commercial nations of Europe involved in the war, there is splendid opportunity for the expansion of the export trade of the United States, especially to the markets of Central and South America, and we are actively co-operating with southern manufacturers and merchants who desire to enter this field. But, under most favorable circumstances, it will take time for the business of our section to recover, and while we hope for better conditions for the south and the Southern Railway, we can not be blind to the present situation of declining traffic and decreasing earnings. It is then a time for caution. The Manufacturers' Record has this past week given an admirable statement of the duty which this situation imposes on us all. I venture to quote a paragraph:

"Every responsible citizen of the United States, in whatever calling he may be, should lose no time in adjusting his material affairs to meet the economic emergency created by the temporary paralysis of civilization in Europe. The very conveniences with which civilization has equipped mankind have begotten a world-wide sensitiveness to any action anywhere interrupting the play of the forces of civilization. In war involving directly seven peoples of Europe, and indirectly all peoples of that continent,

the material influences for the advancement of the human race have virtually collapsed. Consequences are already felt in this country. They will become more manifest day by day and will persist for a while even after wholesale murder and rapine have ceased in Europe. The people of the United States are today beginning to pay the bills for the destruction wrought. Such payments mean resources taken from productive enterprises here and unjustified burdening of every capitalist and wage-earner, every farmer, every manufacturer, every banker, every merchant, every broker in the United States."

In this situation the interests of all officers and employees of the company are identical with the interests of its owners. Wages and dividends are drawn from the same fund—the earnings of the company—with this important difference, that wages must be paid first regardless of whether there is anything left for dividends or not. But the owners of the property who have adventured their money in the provision of this great railroad system which gives employment to tens of thousands of southern people have rights which can not be disregarded, and, but for the fact that it was anticipated that the company would earn reasonable profits, it would have been impossible to secure the money with which we are now making it not only a more efficient carrier for the people of the south and a safer plant on which our employees may work, but are putting it in a position to afford employment to increased numbers of men when business shall have once more revived.

The earnings of the railroad, which are at once the source from which its expenses must be paid and the basis of its credit, can not be advanced by the mere volition of its managers. We are powerless to raise a single passenger or freight rate without the approval of a state or federal commission, and we are now faced with the fact that earnings are decreasing, and that since August first each week's revenues have been less than for the previous week, though the falling off has as yet been rather an indication of a tendency than of an actually serious condition.

I do not anticipate any trouble for the company, but my point is that manifestly this is no time for consideration of wage increases or the eight-hour day. I should be lacking in frankness if I did not say that these matters can not now be considered by the management of Southern Railway Company and if I did not at the same time express the hope that our decrease in business may not become such as greatly to curtail opportunity for employment and make necessary a policy of strict retrenchment. Like the general staff of one of the warring nations of Europe we have long had a plan of retrenchment ready for the emergency and I may say that, disagreeable as retrenchment always is, we have the courage to put our plant into operation, if that shall seem to be the best interest in the long run of the company and of the southern people. But, please God, it may not be necessary. What shall be the event lies largely in the demonstration of character, and patience, and cheerfulness of southern men and women, and I venture to believe that we, as southern men and women, will be as ready, as ever our ancestors were, to accept sacrifices when that shall prove necessary. If such shall become the necessity of Southern Railway Company, the sacrifice will be borne by officers as well as men, but I pledge you my word that I will keep the interests of our men and those dependent upon them faithfully in mind and that no sacrifice will be asked until it shall be necessary. As one responsible for the ultimate decision, I pray for strength to decide right and I ask with confidence the understanding and the support of all you men and women here assembled with whom I am linked in a strong bond of common service to the public and the attachment of many years of association.

HARBOR IMPROVEMENTS AT ANTOFOGASTA, CHILE.—A bill for harbor improvements at Antofogasta, Chile, to include the construction of a railway connecting Antofogasta with the Longitudinal Railway is now before the Chilean senate. The work will cost about $7,600,000, and will be completed in six years.

STRIKE THREATENED ON THE ST. LOUIS SOUTHWESTERN

Conductors and trainmen on the St. Louis Southwestern have taken a strike vote because of the refusal of the management to reinstate a passenger conductor, J. R. Tillman, who was discharged about 16 months ago on a charge of being intoxicated on May 16, 1913, while on duty on passenger train No. 1 from St. Louis to Jonesboro, Ark. The controversy arises from a dispute as to whether Tillman was intoxicated at the time or sick. When he arrived with the train at Jonesboro on the day in question his actions while at the station were such that over a dozen employees of the road who saw him made statements to the general yardmaster, on request, that he was intoxicated, and he was dismissed from service. Nearly all of the statements were very positive, giving details of his actions while around the station, and several said that they had smelled whiskey on his breath, while a few were unwilling to state positively that the man was intoxicated, but said that he bore every appearance of being so.

Tillman claims that he was not intoxicated but sick, and to offset the written statements obtained by the company produced an affidavit from a physician at Jonesboro that he had treated him for acute indigestion and that he had found no evidence to indicate that he was suffering from the effects of alcohol in any form.

The matter was taken up by the officers of the Order of Railway Conductors, who claim that Tillman had been a marked man ever since he gave some testimony unfavorable to the company's contention in a controversy regarding provisions of the schedule when the men had asked for an additional crew on a certain passenger run. A strike vote was taken, whereupon F. H. Britton, president of the road, agreed to conduct a hearing of the case, and all of the witnesses who had given statements were heard at a hearing in President Britton's office in St. Louis, on August 28, 29 and 31, of this year.

A complete printed transcript of the evidence taken at the hearing before a notary public, amounting to 113 pages, has been distributed by the company to all employees in the train, yard and engine service. The hearing was conducted before President Britton by General Manager J. W. Everman for the road, and by W. C. Turner, vice-president of the Order of Railway Conductors, for Mr. Tillman. By agreement each witness was assured by the general manager that he could tell the whole truth in the Tillman case without fear or favor, that the company would fully protect him, that he would be in no danger of being dismissed from the service or disciplined in any way for anything he might say, and Mr. Turner also gave each witness assurance that nothing he might say would thereafter result in causing him any trouble in the hands of the organization. The physician was examined and cross-examined at great length by Mr. Turner and by Mr. Everman regarding Tillman's appearance and condition when he came to him for treatment late in the afternoon. He had arrived on the train in the morning. The examination went into great detail regarding the symptoms of intoxication and of indigestion. Following the doctor's examination the witnesses who had made written statements were asked if they would change them in any way. Two or three who had made positive statements that Tillman was intoxicated changed their testimony to an expression of opinion, but only one reversed his opinion.

It was testified among other things that when Tillman arrived on his train in the morning he staggered when he walked, could not write intelligently in attempting to make out his delay report, could scarcely talk so as to be understood; that he smelled strongly of whiskey; that he fell asleep and was carried into a baggage room, where he spent the afternoon asleep, having been left there by the employees who thought he was intoxicated. There was no evidence that

Tillman had actually taken a drink during the run in question, and the physician attributed his whiskey breath to a swallow of "Peruna." Several persons who had been on the train asserted that he had shown no signs of intoxication during the trip from St. Louis to Jonesboro, and several witnesses asserted that they had never known him to take a drink, although others had seen him apparently intoxicated. At the conclusion of the hearing officers of the Order of Railway Conductors summed up the evidence, asserting it had not proved that Tillman was intoxicated, but that he had been discharged at the first opportunity because the company had decided to get rid of him. But President Britton announced that he could not change his decision and that the company had evidence that Tillman had been in the habit of getting drunk. He said this evidence was not produced at the hearing because of the agreement not to go outside of the case in question. Later, however, the company gave out an affidavit signed by a traveling salesman who had known Conductor Tillman for seven years, who said that he had seen him intoxicated while on duty several times. On the day in question he had boarded his train and found Tillman intoxicated and asleep in the negro compartment neglecting his work.

NEW PETITION IN 5 PER CENT RATE ADVANCE CASE

The railroad companies in official classification territory have filed the following petition with the Interstate Commerce Commission:

"Your petitioners, 112 railroad companies, comprising the thirty-five railroad systems in official classification territory, parties to the above-entitled proceedings, respectfully petition the commission for such a modification of the order of July 29, 1914, which will permit the carriers to make effective the rates specified in the tariffs which were made by said order directed to be canceled. Since the filing of the report and entry of the order by the commission in these cases facts and circumstances have arisen which, taken in connection with the facts already before your commission, your petitioners believe, will justify the relief herein prayed for. These facts and circumstances are briefly as follows:

"First: During the month of October, 1913, your petitioners published and filed with this commission the tariffs involved in these proceedings. At the time of the filing of the report of the commission, there were available for the information of the commission the annual reports of your petitioners for the year ending June 30, 1913, as well as the monthly reports of your petitioners up to and including May, 1914. Since that time the complete income accounts of your petitioners for the fiscal year ending June 30, 1914, have become available.

"The reports of your petitioners for the year ending June 30, 1914, as compared with the year ending June 30, 1913, show a decrease in total operating revenues of approximately $44,700,000, while during that same period operating expenses have increased about $23,300,000. After deductions of taxes and deficit in outside operations, there was a decrease in operating income of approximately $74,700,000 notwithstanding an increased property investment. Thus the tendency toward a diminishing operating income, found by the commission in its report, is emphasized by the figures covering the complete year to June 30, 1914, while the reports for July and such figures as are available for August, 1914, show a continuance of this declining tendency, notwithstanding the extraordinary efforts that have been made to reduce expenses.

"Second: The unforeseen European war has brought about an unparalleled destruction of wealth and dislocation of credit throughout the civilized world. It is certain that the competition for capital will be keener and interest rates higher for some years to come than in any corresponding period within living memory. The emergency thus resulting is extremely serious. It is conservatively estimated that the railroad companies of the United States have obligations maturing in the next fifteen months amounting to well over five hundred millions of dollars, and it is imperative in the public interest that these obligations shall be duly met. A large part of this sum is owed by your petitioners and they will further need from time to time in the next few years large amounts of money to provide for improvements which will be necessary in the public interest to prevent a serious deterioration in the standard of transportation service. In order to compete effectively for this new capital they must have a material increase in revenues.

"Third: The commission in its report made certain tentative suggestions as to measures which might be taken by the carriers to secure additional revenue. Your petitioners are proceeding as rapidly as possible to put into effect the increase in freight rates in Central Freight Association territory authorized by the report of the commission, and are giving earnest attention to the other recommendations and suggestions of the commission with respect to other rates and practices.

"It is believed, however, that the additional revenue which may be secured by the adoption of means other than a general advance in freight rates cannot be obtained in the near future, and when secured will be inadequate to meet the needs of the carriers for increased revenue in the present situation.

"Wherefore, your petitioners ask that the commission modify the order aforesaid, so as to permit the carriers to make effective the rates specified in the tariffs, which were by said order directed to be canceled, except so far as they have been or may be superseded by advances filed in accordance with the report of the commission and that your petitioners may have such other and such further relief in the premises as the commission may deem proper."

THE PLEA OF THE RAILWAY BUSINESS ASSOCIATION

The general executive committee of the Railway Business Association, which held a meeting in Chicago, on September 16, authorized the following statement:

The Railway Business Association commends the spirit in which the railway presidents recently conferred with the president of the United States upon the grave conditions confronting the railways aggravated by the European war, and is profoundly appreciative of the appeal made by President Wilson on behalf of the railways. We are moved thereby to say that the logical sequence of the president's appeal is for business men to plead that the Interstate Commerce Commission may find a way to grant immediate relief in response to the petition which the eastern railways have now filed. This association has always observed an attitude of respect for the commission and has by its utterances ever voiced our appreciation of the burdens imposed upon it and of the perplexities involved in the issues presented for its adjudication. Our appeal to the commission now is made with a friendly desire that it cope, as the exigency demands, with a portentous situation, the factors of which have never before existed in their deliberation.

The president in his conference with the railway executives manifested earnest sympathy with them and showed great familiarity with the facts as presented. The president in certifying that the statement made to him by the railways was a "statement of plain truth," called the attention of the country "to the imperative need that railway credit be sustained," and in urging co-operative effort to that end included, "the action, wherever feasible, of governmental agencies." It was unnecessary to specify the Interstate Commerce Commission, which is the only tribunal possessing information, facilities and authority to afford the immediate relief required.

The substitute methods of increasing income pointed out in the decision of July 29, were volunteered by the commission to meet what it considered to be then existing conditions. It seems to us that it would be entirely proper, as it

is surely important, for that body now to volunteer a solution to meet the unlooked-for emergency. The previous investigation was so recently concluded that the data already at hand is ample. Legally, the tariffs suspended in that case have now been withdrawn but physically they exist. The commission has already given exhaustive consideration to the details of the decree which would have been issued had it been decided to grant an advance to the trunk lines and to New England. In any event, upon return of normal conditions the commission can at any time readjust rates if revenue is regarded as too large.

Out of the war has risen an emergency affecting the railways which has no parallel and which demands extraordinary measures. Reports of earnings and expenses for the year ending June 30, 1914, which were not yet available when the commission decided the five per cent case, have now been laid before the commission and show a serious decline of operating income in face of increased property investment. The war has influenced and is inflicting still further losses in gross earnings. It was evidently the commission's expectation that current earnings would be sufficient to tide the roads over until the new sources of revenue should materialize into money. The war has put an end to that hope. The roads are now vigorously taking steps to follow the recommendations of the commission as to passenger rates, unremunerative freight rates, free services and other matters. It is, however, a work exceedingly intricate and of large volume and considerable time must necessarily elapse before any of these resources can be made to yield income. Neither the roads nor the country can afford to wait. Immediate relief is required in the interest of all concerned.

It would be difficult to overestimate the value and the importance of the stand taken by President Wilson in counting the problem of railway credit as among the imperative measures for national protection against the evils of the war.

"This is a time," says the president, "for all to stand together in united effort to comprehend every interest and serve and sustain it in every legitimate way."

The price level and strength of railway securities has a potent influence upon the financial transactions of all other corporations. If railways cannot renew their notes or refund maturing bonds this fact severely impairs the confidence which lenders feel in other companies. Current prices for old issues cannot decline far without destroying the market for renewals and refundings, not to mention new securities, of which no one at this moment thinks. The outbreak of hostilities caused the wholesale return to this country of American railway securities held abroad and prices slumped violently. This sacrifice was temporarily suspended by the closing of the European and American stock exchanges. The government cannot by legislation provide volume of tonnage; but impairment of credit may be mitigated to some extent by an advance in freight rates. This would stay the downward tendency of income somewhat and the sanction itself would be invaluable as making good in substantial fashion the declared purpose of the commission "to aid, so far as we legally may, in the solution of the problem as to the course that carriers may pursue to meet the situation."

We would respectfully urge upon Congress that in consideration of railway mail pay the recommendation of the congressional joint committee points a way whereby the railways may be dealt with in a spirit of greater liberality than is provided in the house bill now under consideration in the Senate. This is surely a time when the government should be actuated by a desire to pay adequately for an important public service rather than to drive a hard bargain with the carriers because it has the power to do so.

We earnestly hope that the prayer of the railway executives that the roads be relieved as far as possible of further immediate burdens involving additional expense will be heeded by legislative and regulatory bodies and that railway employees will refrain from pressing at this time demands which, if granted or awarded, would result in higher labor cost.

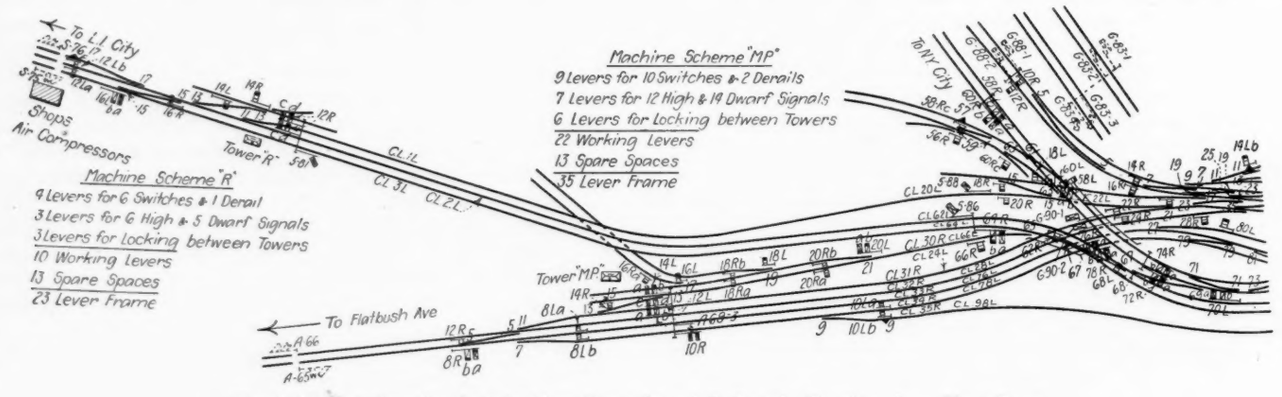
EXTENSIONS AND IMPROVEMENTS TO RAILWAYS IN HONDURAS.—A 10-mile railway, to be operated by the Trujillo Railroad, was built in 1913, from the port of Trujillo to Juticalpa, and it is probable that it will be extended this year for a considerable distance. Work has been started by the Cuyamel Fruit Company on an extension of its line from Vera Cruz to Omoa, nine miles, and it is expected that work on a wharf 800 ft. long at Omoa will be finished this year.

EXTENSIVE INTERLOCKING AT JAMAICA, LONG ISLAND

An unusual combination of interlocking plants has been installed at Jamaica, Long Island, on the Long Island Railroad, to protect train movements through that terminal. A complete description of the terminal track and station improvements was published in the *Railway Age Gazette* of August 1, 1913, page 184.

The signaling installation consists of four electro-pneumatic interlocking plants, one east and three west of the station, together with a considerable number of electro-pneumatic automatic block signals, all of which are shown in the track layout, herewith. The interlocking plant east of the station, known as "J E," has a machine of 71 levers, controlling 36 switches, 3 derails, 7 double-slips with movable-point frogs, 29 signals, and 27 dwarf signals, and has 11 spare spaces. This plant governs switches and signals for train movements to or from Rockaway Junction, Springfield Junction, and the station, as well as main-line movements between Jamaica, Montauk Point, and intermediate stations.

The interlocking known as "J" is the largest of the four and


To L.I. City
Shops
Air Compressors
Machine Scheme "R"
9 Levers for 6 Switches & 1 Derail
3 Levers for 6 High & 5 Dwarf Signals
3 Levers for Locking between Towers
10 Working Levers
13 Spare Spaces
23 Lever Frame
Tower "R"
Machine Scheme "MP"
9 Levers for 10 Switches & 2 Derails
7 Levers for 12 High & 19 Dwarf Signals
6 Levers for Locking between Towers
22 Working Levers
13 Spare Spaces
35 Lever Frame
Tower "MP"
To Flatbush Ave
To NY City

Track Layout, Jamaica Interlocking, Long Island Railroad—Continued on Next Page

is located, with two other plants, west of the station. The machine has 86 working levers and 21 spare spaces, controlling 54 single switches, 4 derails, 9 double-slip switches with movable-point frogs, 1 pair of movable-point frogs, 39 signals, 29 dwarf signals, and has 21 spare spaces. The other two plants are known as "M P," which has 22 working levers and 13 spare spaces, and "R," which contains 10 working levers and 13 spare spaces.

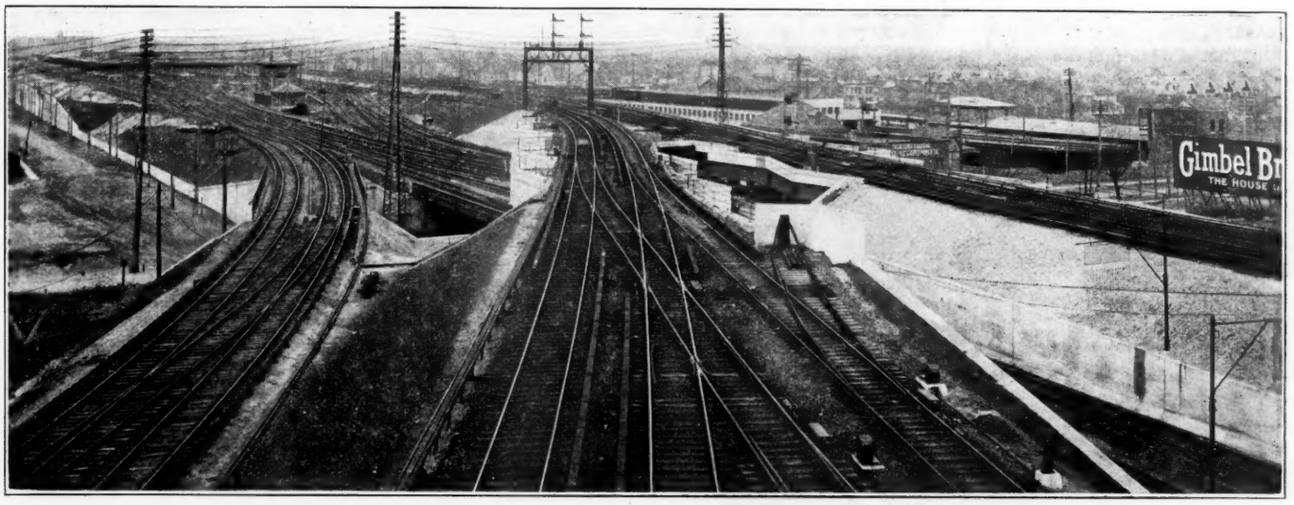
INTERLOCKING TOWERS

The interlocking towers are of brick, each two stories high, and are of artistic design. The upper floors contain the interlocking machines, while the ground floor houses the motor-generators, switchboards and cabinets which hold relays, fuses, etc. A basement is provided for storage batteries, transformers, etc., and also a heating apparatus and workshop for maintainers.

POWER SUPPLY AND DISTRIBUTION

Power is furnished from the Woodhaven substation and is transmitted at 2,200 volts, 25 cycles, a. c. Oil-cooled static transformers cut this down to 220 volts for lights, motor-generator sets, and two small air-cooled transformers which supply the track circuits. Motor-generator sets supply direct current at 12 volts, through the medium of storage batteries for operating switches and signal units. Compressed air is supplied from the Morris Park carshops, for operating the electro-pneumatic signals and switches.

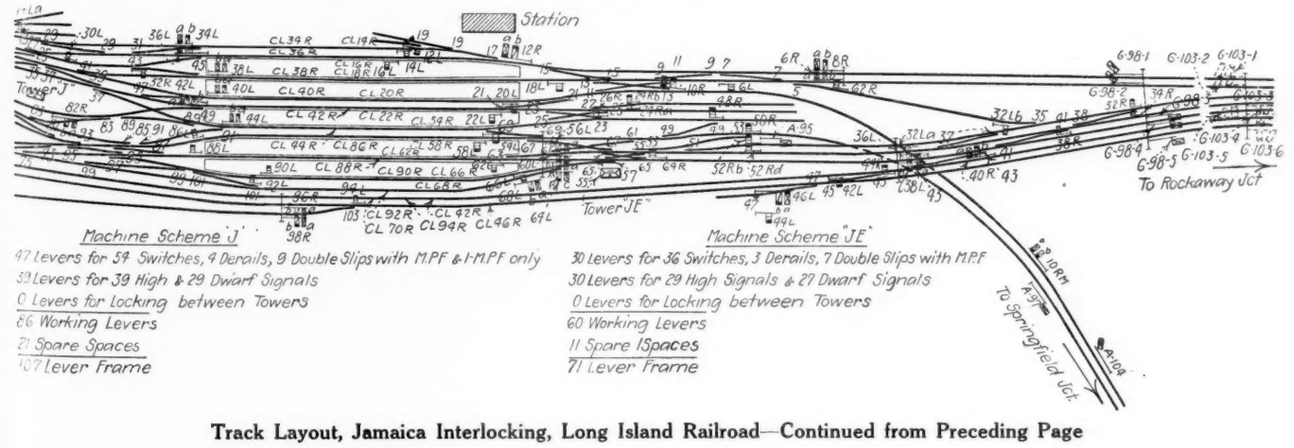
The storage batteries charged at 12 volts d. c. by motor driven generators, consist of duplicate sets of seven cells each, and have sufficient ampere-hour capacity to supply direct current of from 12 to 14 volts for the operation of all switch and signal controlling magnets, etc., as well as to operate the generators as motors when for any reason the primary current is cut out. Each of the duplicate power-generating sets is made up of a 15-volt, d. c. generator and an a. c. synchronous motor. A failure of the primary supply causes the d. c. generator to be driven as a motor by current from the storage batteries, and the synchronous motor becomes a generator giving 220 volts 25 cycles a. c. Provision is made for automatic changes in the field connections, so that the reversing of the motor-generator necessitates no field adjustments whatever. If the primary power fails when the lights are not needed, the apparatus is so arranged that no emergency shifting of connections takes place.



Jamaica Interlocking Looking East, Long Island Railroad

INTERLOCKING MACHINES

The interlocking machines are the Union Switch & Signal Company's standard electro-pneumatic type, with equipment for electric detector circuits, which are used throughout the plant in place of detector-bars. Each machine has a track model, as shown in the illustration. Small lamps, which illuminate small round disks set in the sections of the model representing sections of track indicate whether the different track sections are occupied.


Station
Tower J
Tower JE
To Rockaway Jct
To Springfield Jct
Machine Scheme 'J'
47 Levers for 34 Switches, 4 Derails, 9 Double Slips with M.P.F. & 1-M.P.F. only
39 Levers for 39 High & 29 Dwarf Signals
0 Levers for Locking between Towers
86 Working Levers
21 Spare Spaces
107 Lever Frame
Machine Scheme 'JE'
30 Levers for 36 Switches, 3 Derails, 7 Double Slips with M.P.F.
30 Levers for 29 High Signals & 27 Dwarf Signals
0 Levers for Locking between Towers
60 Working Levers
11 Spare Spaces
71 Lever Frame

Track Layout, Jamaica Interlocking, Long Island Railroad—Continued from Preceding Page

ELECTRIC LOCKING

Approach electric locking is provided throughout. Indicators are also provided to show the presence of trains in these approaching sections. Route locking is provided throughout, which, through the track circuit, locks all levers governing any route as soon as a train passes the signal governing that route. The

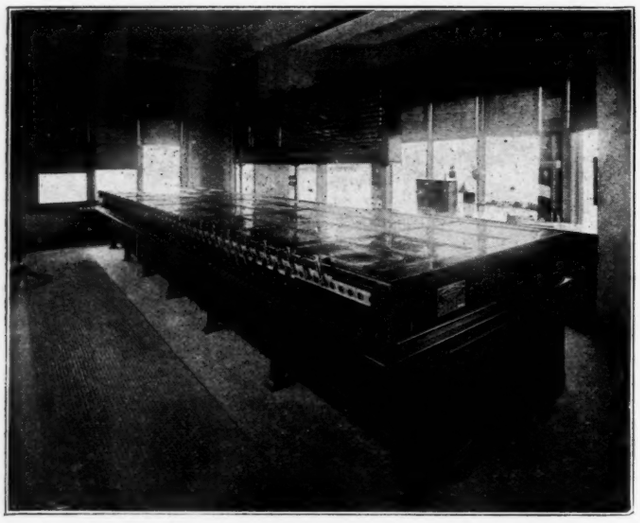
switch-levers are released as soon as the rear end of the train passes the switch point of the trailing switches or the fouling points of the facing switches, which allows for the maximum number of movements consistent with safety.

A system of locking is provided between towers, affording all needed facilities for using tracks in both directions, and this is so arranged that clear signals cannot be given for conflicting movements between towers; but for emergencies there is a clockwork time release. By the use of this release low speed movements can be made into a section which is already occupied.

SIGNALS

The controlling valves for the compressed air are arranged so that any failure of the controlling current will de-energize the magnet controlling the valve and will prevent air entering the cylinder. Thus any failure will result in the signal giving the stop indication.

The top arms of the high speed signals are used for indicating straight route only, and the lower arms indicate for diverging routes. All signals are three-position, operating in the upper quadrant.



Machine at "J" Tower, Long Island Railroad

CONSTRUCTION

The apparatus in the four plants was installed by the Union Switch & Signal Company, under the supervision of E. M. Weaver, engineer of maintenance of way of the Long Island Railroad, Charles Soper, supervisor of signals, and L. S. Vieillard, inspector.

A CONCLUSIVE ARGUMENT

[From the Portland, Ore., Oregonian.]

There has recently come to light a story which indicates the present predicament of some of the railroads. In a small town the city council determined that the railroad should build a new station. The president of the road pointed out to the council that no funds were at hand and none could be borrowed to build such a station.

"A way will have to be found," said the council.

"Well," said the railroad president, "I'll tell you what I will do. I'll give you the railroad. I don't mean sell it to you, but give it to you. You can have it, equipment, right of way, property, debts and all. I'll turn it over to you right now."

The bonded indebtedness of the road was large, there was an annual deficit and the city refused to take the railroad that was handed to it virtually on a silver platter. But the demand for a new station was withdrawn. The argument of the railroad president had been conclusive.

FLANGE OILERS

F. W. Edwards, mechanical engineer of the Ohio Injector Company, presented a paper on this subject at the September meeting of the Western Railway Club. Mr. Edwards briefly sketched the history of the development of the flange oiler, and in speaking of the advantages of the flange lubricator he said in part:

There are numerous cases where a new locomotive was put into service and after thirty days it was necessary to take it into the shops to change tires because the flanges were worn down to the minimum; many other cases where 60 days' service would wear the flanges to minimum, while on numerous roads 90 days appeared to be the absolute limit of service for a set of new tires. Every 1/32 in. flange wear requires the removal of 1/16 in. of metal from the tread of the wheel, and ⅛ in. flange wear would require the removal of ¼ in. from the tread. On many roads this represents one year's tread wear. Taking this as our basis, we must figure on the removal of ½ in. to ⅝ in. of metal from the wheel tread every time a pair of wheels is taken into the shop for turning, on account of the flanges being worn to the minimum. This represents a loss of two years of actual mileage metal. The amount chargeable to the turning of a pair of locomotive driving wheels when the flanges are worn down to the minimum will vary. It was found that on an average it costs $40 for every pair turned. If this one expense could be eliminated, it does not require very close calculating to prove that a great saving has been made, and the cost of the maintenance per engine mile greatly reduced.

The application of the flange oiler works in with one of the foremost subjects of today—"Safety First." One instance that stands out more clearly than others was a switching engine in a Buffalo yard. This engine was working on a sharp lead going into the freight house tracks. The driving wheel flanges had worn so that they came in direct alinement with the worn sides of the rail, but were not down to the minimum. Just as soon as these two lines come together, the driving wheel flange would grip on the rail, raising the engine over the rail and off the track. This was an almost daily occurrence. The flange oiler was applied in July, 1909, and the engine placed in the same service, leaving the flanges just as they were. A careful record kept on this engine up to December, 1912, shows that the engine was not off the track once during that entire time. Another engine in switching service that could not be run longer than three months without its being necessary to turn the driving wheels on account of sharp flanges was equipped with a flange oiler and oil applied to the forward and back drivers on each side of the engine; this engine ran 20 months instead of three months and made 39,785 miles, and the driving wheels were then turned for tread wear only. On one road, four heavy Pacific type passenger engines without flange oilers could make about 39,770 miles when flanges were reduced to the limit. These same engines in the same service with flange oilers applied made an average of 91,850 miles. On another road one Atlantic type passenger engine without flange oilers would only make 20,000 miles, when the flanges would be worn to the minimum. After flange oilers were applied in the same service this engine made 110,000 miles, a gain of 450 per cent, and the front tire flanges showed 1 5/32 in. full and the back tire flanges 1 3/16 in. full. There are other records of success fully as interesting.

In order to give some idea of the saving in dollars and cents, we have one instance where a road in switching service had one engine working in a yard by itself, and after one year's service with this engine equipped with flange oilers they showed a total saving of $400. On another engine doing similar work in another yard, $160 was saved. The amount of saving in both instances is based upon oil, driving wheel tires, track material and labor. These examples can be

duplicated on any division or any number of divisions where flange wear is a source of annoyance.

It is a known fact that where there is excessive wheel flange wear there is also excessive rail wear, and the remedy for one is the remedy for the other. The flange oiler is the remedy and it has proven so effective that it would be a paying investment for the railroads if they equipped their engines with flange oilers for the saving of the rails only. The flange oiler is also an important factor in fuel economy, as it will reduce the friction between the wheel and the rail.

The initial cost of a flange oiler which will reduce the cost of locomotive repairs and track maintenance, and show economy in fuel is approximately $75 to $85 applied to a locomotive. The oil will cost from 16 cents to 18 cents a gallon, and one gallon is sufficient for from 500 to 800 miles of engine service, which would make the cost about 2 cents or 3 cents per 100 miles for oil. The cost of turning the tires on the average locomotive and the value lost in service, which on an average is about $125 to $200 per day, will more than pay for the initial cost and application of the flange oiler, to say nothing of the increased tonnage, fuel economy, derailments eliminated, saving on switch points and frogs, higher speed on curves with the greatest element of safety and more than doubling the life of rails on curves.

Discussion.—The discussion brought out that care is necessary in the application and maintenance of flange oilers. Flange wear is often due to incorrect alinement of driving wheels and by placing more weight on the leading truck it has been found possible to reduce it 50 per cent. The greatest benefit is found on curved track.

PORTABLE STEAM STERILIZER

The accompanying illustration shows a portable steam boiler for sterilizing drinking water coolers in passenger cars as provided by law. It is sold by the West Disinfecting Company, 12 East Forty-second street, New York City. It consists essentially of a steam boiler of 10 gal. capacity, which is heated by a kerosene vapor flame from three Lovett Giant flash burners in a tank under the boiler. The boiler is well lagged with two thicknesses of asbestos, that next to the boiler being composed of soft fiber and that next to the jacket being asbestos mill board. The jacket extends below the boiler and forms the furnace within which the oil tank is placed.

Steam Sterilizer for Water Coolers

The boiler is constructed of galvanized steel, the joints being welded by the oxy-acetylene process. It is built to stand a test of 200 lb. steam pressure, which gives an ample factor of safety for the working pressure of 40 lb. to 50 lb. The fuel tank is also built of galvanized steel in the same manner, to withstand a test pressure of 75 lb., the actual working pressure being about 7 or 8 lb., which is secured by means of a hand pump incorporated in the construction of the tank.

The device is mounted on wheels so that it may be easily moved from one car to another throughout the yard. The steam is taken from the top of the boiler and is discharged through a ⅛-in. outlet into the cooler, which is turned upside down over the outlet, as shown in the illustration. With this sterilizer one man has sterilized 157 coolers from 34 cars in eight hours, using 4 gal. of low grade kerosene costing approximately 5 cents per gallon, and 16 gal. of water. In this specific case the cost of labor for performing this work was $1.52. To do this work it was found necessary to refill the boiler four times, and to replenish the burner twice. The boiler is easily filled by simply removing the nozzle from the end of the discharge pipe, placing a water hose thereon. The water is then turned on and allowed to pass into the boiler in this manner, the top gage cock being opened to provide the necessary vent. In this way it is not necessary to draw all the steam off the boiler nor to extinguish the light. When being filled in this manner only 15 min. is required to raise the pressure sufficiently high for operation. On starting up in the morning, however, 30 min. is required to bring the boiler up to a working pressure. Tests have shown that it is only necessary to sterilize the coolers by this method for one minute, very satisfactory results being obtained in this time.

While the number of coolers that can be handled by one man has been found to be about 160 per eight hours, it is believed that two men would be able to handle between 250 and 300 coolers in the same time if necessary. The roads using this system have found it more satisfactory than the yard steam line system. Dryer steam is obtained, and where these machines are in service the yard steam line has been discontinued entirely, thus eliminating the losses due to condensation. It is also estimated that this device will save from 25 to 30 per cent in the cost of labor for sterilizing the water coolers. Each sterilizer is provided with a steam gage, water glass, three gage cocks, washout plug and safety valve. The whole device weighs 325 lb. when loaded for operation.

LEGISLATION RELATING TO OPERATION

The Special Committee on Relations of Railway Operation to Legislation has compiled a table similar to that which has been issued in previous years, which is reproduced herewith, showing the classification of bills introduced and laws enacted relating to railway operation in the state legislatures which were in session in 1914. The table shows that in 14 states in which the legislatures were in session, including special sessions, 236 bills relating to railway operation were introduced of which only 27 were enacted. A comparison with the three preceding years is shown in the following table:

	1914	1913	1912	1911
Legislatures in session.....	*14	42	*19	37
Bills introduced	236	1,395	292	512
Laws enacted	27	230	48	†

*Including special sessions.
†This data not compiled in 1911.

As in previous years laws relating to employees, equipment and stations were the most numerous among those passed. There were 16 laws enacted relating to employees, of which 6 relate to terms of employment, 4 to hours of service, 4 to service letters and time of payment, 1 a full crew law, and 1 relates to

shelter for employees. There were 3 laws relating to equipment, including 1 pertaining to cabooses, 1 a headlight law, and 1 a safety appliance law, and there were 3 station laws. Only one law was enacted relating to crossing protection, in New Jersey, and none were enacted relating to freight trains, cars, block signals, clearances or maintenance of way. There was one law in South Carolina regarding the stopping of passenger trains, one law regarding the time of payment of claims in Virginia, and one law is classified under the head of miscellaneous. One law regarding trespassing was enacted in Louisiana.

Thirty-one bills were introduced in Louisiana and in Mississippi, of which five were enacted in each state. South Carolina and Virginia each passed 6 bills out of 28 introduced in South Carolina and 29 introduced in Virginia.

BILLS INTRODUCED AND LAWS ENACTED IN STATE LEGISLATURES, RELATING TO RAILWAY OPERATION
(SESSIONS OF 1914)

Subjects	Colo.*		Ga.		Ky.		La.		Md.		Mass.		Miss.		N. J.		N. Y.		Ohio*		R. I.		S. Car.		Texas*		Va.		Total	
	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted
Employees—																														
Full crews	..	..	1	..	1	..	2	..	..	..	1	..	1	1	..	..	1	..	..	..	..	..	2	..	..	..	1	..	10	1
Hours of service	..	..	..	..	..	..	..	..	6	1	4	2	3	1	2	..	2	..	..	..	..	..	..	..	..	..	1	..	18	4
Service letters and time of payment	..	..	1	..	5	..	6	1	1	..	3	..	5	2	1	..	..	..	..	..	..	..	2	1	..	..	2	..	26	4
Terms of employment	..	..	2	..	2	..	7	3	..	..	9	1	11	1	1	..	6	..	..	..	6	..	2	..	..	..	4	1	50	6
Experience of	..	..	..	..	..	..	1	..	..	..	..	..	2	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	4	..
Shelter for	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	1	..	4	1
Arbitration—																														
a. Compulsory	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	6	..
b. Voluntary	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
Equipment—																														
Caboose	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	2	1
Headlights	..	..	..	..	..	..	1	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	1	6	1
Safety appliances	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	3	..
Repair of	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Appliances required	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	1	4	1
Passenger Trains—																														
To be run	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..
Stops	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	2	1	..	..	..	..	5	1
Equipment of	..	..	..	..	1	..	..	..	..	..	1	..	1	..	..	..	2	..	..	..	1	..	2	..	..	..	..	..	8	..
Baggage	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Make-up of	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..
Freight Trains—																														
Speed of live stock	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	2	..	1	..	..	..	..	..	4	..
Sunday trains	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	5	..
Handling of explosives	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..
Make-up of	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	3	..
Cars—																														
To be furnished	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Demurrage	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..
Block and Other Signals—																														
Block and interlock	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..
Crossings—																														
Required	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..
Protection	..	..	..	..	1	..	..	..	..	..	..	..	..	..	3	1	1	..	..	..	..	..	..	..	..	..	1	..	6	1
Separation of grades	..	..	..	..	..	..	..	..	3	..	..	..	1	..	3	..	3	..	..	..	..	..	1	..	..	..	1	..	12	..
Maintenance of Way—General—																														
Track scales and weighing	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	3	..
Burning weeds	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
Stations—																														
Required	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	..	..	..	..	2	2
Equipment of	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	3	..
Track connections	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	2	1	4	1
Hospitals and Relief Dept's.	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
Claims—																														
When to be paid	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	2	1
Trespassers	..	..	..	..	1	..	3	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	1
Reports—																														
Accidents	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	3	..
Miscellaneous	..	..	4	..	1	..	5	..	..	..	..	..	2	..	1	..	2	..	..	..	..	..	5	1	..	..	1	..	21	1
Total	2	0	13	0	18	0	31	5	13	1	21	3	31	5	12	1	23	0	0	0	15	0	28	6	0	0	29	6	236	27

*Special sessions.

SAVING CAR DAYS

O. C. Castle, car service agent of the Sunset-Central Lines, has issued a bulletin on the subject of "Saving Car Days," giving figures to show that during the fiscal year 1914 the system made a saving in car hire balance of $430,865, a daily average saving of $1,180, or the equivalent of 2,622 car days. The average mileage per car per day for all cars on the line increased from 20.4 in 1912-13, to 21.9 in 1913-14, while the movement of foreign cars increased from 21.4 to 28.6 miles per car per day. The bulletin states that these results were accomplished by eternal vigilance and persistent "plugging" on the part of hundreds of loyal employees in the campaign to save car days; and it urges all the employees and the officers to continue their efforts in this direction. The bulletin concludes with the following:

"From the present unsettled outlook, due to the European war, the company is going to need every 'car day' we can put away in our savings banks.

"Let's watch the little car days, and make the slogan 'Save the Car Days' next in importance to 'Safety First.'

"I'll be glad to get a note from any one any time, telling how you have saved a 'car day.' Am sure the assistant general manager will take time to look at such notes as I may pass along to him. And the president, too—he is never too busy to hear about a piece of good work in the line of car movement.

"After all, when you come to think of it, that's what we are all here for—to move cars; and if we move the cars the 'days' will take care of themselves."

NEW RAILWAY LINE FOR GREEK GOVERNMENT.—Early in 1914, the government of Greece made arrangements to secure control of the railway known as the La Societe des Chemins de Fer Hellenique, and the government also entered into a contract with La Societe de Constructions Batignolles to connect that railway with the railways from the port of Salonica to Monastir and from Salonica to Scopia. It is expected that the work will be finished and the new line put in operation not later than April, 1915. The contract price for the work is $2,316,000, and plans are now being made for the purchase of the necessary locomotives and other rolling stock.

Maintenance of Way Section

In order to present a complete report of the convention of the American Railway Bridge & Building Association, which will meet in Los Angeles on October 20-22, inclusive, the October maintenance section will be postponed from the regular date of October 16, to October 23.

The Curving of Rails

An interesting contrast of ideas was brought out in the discussion of the curving of rails at the Roadmasters' convention last week. The committee originally recommended that rail for all curves over six degrees should be curved. In the discussion, one member advocated curving all rails for curves of three degrees and over. Several other members opposed curving rails for curves of less than 10 or 12 degrees and some would eliminate it under all conditions. The tendency on the better maintained roads is to curve rails for curves down to three degrees, the object, of course, being to obtain a better riding track and one that can be maintained to line more easily. It is evident that curving the rails before placing them in track should promote these results. On the other hand, the general objection to this practice on the part of the roadmasters shows a serious difficulty. The objection is not to the practice itself, but is based on the difficulty of curving the rails in the field at a reasonable expenditure of time and money. Various devices have been perfected which will curve rails, but few give a sufficient output with the heavy sections of rails and hard metal now employed. It was for this reason that the association finally decided to recommend that rails to be curved should be curved at the mill and eliminated the recommendation regarding the degree of curve at which this work should be started. The curving of rails at the steel mills will probably meet with the opposition of the manufacturers, since it will require additional and slow work on their part. It will also add somewhat to the difficulties of loading and shipping the curved rails. As an alternative, it would seem advisable for the roads to establish a power driven rail curver at some centrally located point on their lines where rails could be curved for particular locations, as desired. With the necessity for continually increasing standards of maintenance, the curving of rails is to be desired, and the problem is how to do this economically and expeditiously.

More Care in Conducting Tests

It would appear unnecessary to suggest that if any device or material is considered of sufficient merit to warrant a test of it being made, such test should be conducted in such a way as to secure the greatest amount of comparative information. Observation shows that this often is not done. A new type of crossing is inserted at a single intersection where there are little or no data regarding the life of former crossings, and where there is no opportunity of comparing the life of the new crossing with that of others carrying the same traffic under the same conditions. Again, a curve is laid entirely with rails of a new composition, and an attempt is made to compare the results secured with those of standard rails laid on another curve several miles away with different conditions of grade, curvature and traffic instead of laying half of the curve with the experimental rail and the remainder with the standard material. In selecting a location for a test it is also advisable to choose a place where conditions are severe to secure an accelerated test in order that the results may be made known at an early date. For this reason it is better, for instance, to place experimental rails on curves of high degree rather than on tangent. If a material or device gives indications of possessing considerable merit it is of as much advantage to the railway as to the manufacturer to determine this fact, and both should co-operate fully in the conduct of the test. When the manufacturer furnishes the material, frequently at or below cost, in order to have the test made, it would seem only fair that the road should co-operate to the extent of placing this material where the most comprehensive results may be secured. Manufacturers frequently complain that this is not always done. Where this condition exists the difficulty commonly arises from the fact that the man who authorizes the test and arranges with the manufacturer to secure the materials turns them over to his subordinates to install with very incomplete instructions and pays little or no further attention to them. Not knowing the purpose of the test, and taking very little interest in it, the subordinates frequently place the materials where they will require the least expenditure of energy on their part, regardless of the purpose of the test.

FIXED DATES FOR SEASONAL MAINTENANCE WORK

THE suggestion is made in one of the papers on handling material, published in this issue, that economy could be promoted by fixing certain dates for some classes of maintenance work that are seasonal in nature and requiring all foremen to attend to such work at the specified time. The author had in mind particularly classes of work requiring large quantities of material, and that the plan he suggests would enable the store department to carry a minimum stock of such material except immediately in advance of the date specified, when a heavy demand could be anticipated. The regular stock of crossing planks, tie plates, bolts, fencing material, etc., could be considerably reduced the rest of the year with a resulting saving in interest on the investment in such stock.

In addition to this advantage the suggested practice has another strong point in its favor which alone has warranted its use to some extent. On one eastern road a general order is issued each year to all section foremen that the right of way must be mowed during a certain week. The considerations which first prompted this order were the desirability of insuring the cutting of all weeds at the time when their propagation would be at least partially arrested and of maintaining a uniform appearance along the line, particularly just before the early fall inspection. Experience has shown, however, that the absolute check provided on the performance of each gang on that particular work is one of the most important advantages of this system. Foremen who are poor organizers and who, as a result, waste considerable time in changing from one job to another and moving around over their sections are forced to apply themselves diligently to the one task until it is completed. By this means a direct comparison between different gangs is afforded, due allowance being made for differences in conditions on the various sections.

The same advantage would be gained in handling other maintenance work seasonally as in mowing the right of way, and in so far as this system is applicable it would tend to attain the same end as the equating of track sections which has been tried to a limited extent on some eastern roads. This consists in the establishment of some unit by which the performance of section gangs can be measured, a thing highly desirable inasmuch as the determination of a unit should be the first step in any attempt to increase the output of laborers.

PERMEABILITY OF CONCRETE

IN the design of many railway structures it is necessary to assume that water will not penetrate a concrete slab or wall. To secure this condition of impermeability reliance is sometimes placed on the impermeability of the concrete, in other cases slacked lime, alum, or some other ingredient is added to the mixture, and in probably the majority of cases a coating of some waterproofing material is spread on the surface. In most solid floor bridges, arch structures and foundation walls below the ground-water level it is considered necessary to adopt the latter method, although for retaining walls, buried abutments, etc., opinion seems to be divided between three general views. The first is that no provision need be made for excluding water, concrete mixed in the usual proportions and in the usual way being impervious enough; the second, that extreme care should be taken in removing the water pressure by laying porous material next to the concrete and by placing blind stone drains or tile lines leading to weep holes at frequent intervals; and the third, that the entire surface exposed to the water should be carefully waterproofed and ample drains also provided.

The application of waterproofing coating to a concrete surface adds materially to the cost, and some are questioning whether an equal degree of imperviousness could not be secured at less expense by paying more attention to the quality of the concrete. It has been demonstrated repeatedly that watertight concrete can be made, a notable example being the concrete water tank on the Baltimore & Ohio, in the construction of which a 1:1⅞:3½ mixture was used, slacked lime was added in mixing, and the entire inner and outer surface was coated twice with a cement coating. Little data is available as to the amount by which the cost of concrete is increased in making it impermeable. While it is evident that the elaborate precautions taken in the Baltimore & Ohio tank work would be prohibitively expensive for structures in which a degree of permeability is less objectionable, the experience of many engineers leads to the belief that at least in many cases, a slight increase in cost to secure more careful proportioning, mixing, placing and curing of concrete would be more than repaid by its impermeability.

In general, it has been recognized that a rich mixture and wet mixing decrease permeability, but there has been a lack of definite data to guide men in the field in attempting to place concrete that would not require waterproofing. Tests along this line have in the past been concerned chiefly with neat cement and mortar. A series of tests now under way at the University of Wisconsin are the basis for a number of interesting conclusions in a paper by Morton O. Withey, read before the Western Society of Engineers on September 14, covering the degree to which ordinary gravel concrete can be made to resist the passage of water and suggestions for increasing its resistance to.

As to the most suitable mixture, a 1:1½:3 by volume was shown to be very impervious, although in nearly all cases the mixtures of 1:7, or richer, showed a rate of flow for a 50-hour period under a head of 40 lb. per sq. in. less than 0.0001 gal. per sq. ft. per hr., which is negligible for ordinary structures. It is, of course, to be remembered that for many cases other objections in addition to the cost could be advanced against the rich mixtures, and the author mentions the fact that a rich mixture is subject to greater changes in volume under alternate wetting and drying, necessitating added provision for reinforcement and expansion joints. The tests also showed that the permeability of such concrete can be decreased by grading the sand and gravel to reduce the voids, by increasing the fineness of the cement for 1:9 mixtures, by mixing the concrete longer than is customary, with a short period of dry mixing of the aggregate before the water is added, and by exercising more care in the curing of the concrete.

When a graded mixture approaches the theoretical curve of minimum voids, the concrete is practically watertight under pressures up to 40 lb. per sq. in. The best results with 1:9 mixtures were secured when the mixer with a rate of 30 r. p. m. was run at least 1½ to 2 min. For richer mixtures 1 min. seemed to be long enough.

THE OPPORTUNITY OF THE ROADMASTERS' ASSOCIATION

THE convention of the Roadmasters' Association, held last week in Chicago, was one of the best in the history of that organization. While it did not equal that of last year in point of attendance, the discussions and reports were equal to those of any previous meeting.

This association has made a very gratifying growth during the past three years. But, while the active membership has now passed 800, it includes only 40 per cent of the roadmasters of the country, exclusive of their assistants. No association has a more important field for study and the exchange of ideas. Over $350,000,000 is spent annually for maintenance of way and structures. Over $225,000,000, or 60 per cent of this amount, is spent under the direction of the roadmasters. In other words, the average roadmaster is responsible for the proper expenditure for labor and material of over $100,000 annually. It is to study of the application of these large sums that this association is devoted.

The comment is sometimes heard that the Roadmasters' Association is no longer necessary since the formation of the American Railway Engineering Association, and that its work is being done by the latter association, resulting in unnecessary duplication. However, a glance at the reports of these two associations will show that there exist the same distinct fields for association work that are to be found in the railway organizations themselves. The activities of the two organizations should be correlated but not conflicting. With the many important problems now confronting the maintenance of way department, there is a demand for all the constructive work each association can do without duplicating the work of the other. In planning committee work for the year, the officers of these and other maintenance associations should bear this point in mind, since all of them are working to the same end, that of promoting the efficiency of maintenance of way work. For this reason it would have seemed advisable for the committee on Track Accessories not to have attempted to recommend definite dimensions for frogs and tie plates, since the American Railway Engineering Association has already adopted complete specifications and designs for these materials, and especially since this report was prepared without considering these other designs and is in conflict with them. On the other hand, reports on such subjects as The Laying of Rail, The Organization of Forces, and The Policing of Right of Way, are distinctly within the province of this association, as they discuss problems with which the roadmaster is continually confronted. There is a wide field for the Roadmasters' Association in the investigation of economical maintenance methods and organization in the track department. More money is spent for track labor than for all track material, and it is in the study of means for economizing in the use of this labor that the greatest opportunity of the Roadmasters' Association should be found.

BRIDGE AND BUILDING CONVENTION

The next convention of the American Railway Bridge & Building Association will be held at the Alexandria hotel, Los Angeles, on October 20-22, inclusive. Committee reports will be presented on Ice Houses and the Preservation of Ice for Railway Service; Warning for Overhead and Side Obstructions; Railroad Crossing Gates, Towers, etc.; Reinforced Concrete Bridge Work; Station Buildings for Passenger Service; Mechanical Coaling Stations; Care of Traffic While Constructing Bridges to Eliminate Grade Crossings; Water Supply; Concrete Culvert Pipe and Piles; Heating, Lighting and Ventilating Roundhouses and Shops, and Concrete Posts, Poles and Signs.

From present indications a large number of members are planning to attend. For the benefit of those going from Chicago and east, arrangements are being made by the secretary, C. A. Lichty, C. & N. W., Chicago, for special cars going via the Santa Fe with a stop at the Grand Canyon en route. Sufficient reservations have already been made for two cars and it is probable that a third will be required.

The Roadmasters' Thirty-Second Annual Convention

An Abstract of the Committee Reports and Discussions at the Meeting Held Last Week in Chicago

The thirty-second annual convention of the Roadmasters' and Maintenance of Way Association of America was held at the Auditorium Hotel, Chicago, on September 8-11, inclusive. While the attendance did not reach the previous high record established last year, the convention was more than usually successful in point of interest and value of the discussion to the members, while the exhibits of the Track Supply Association were more numerous and representative of maintenance of way materials than at any previous convention.

Over 225 members were present, the average length of railway service of these men being 28 years.

The convention was called to order by President T. F. Donahue (B. & O.) at 10:30 Tuesday morning, and was opened with invocation by Past-President A. M. Clough. The association was welcomed to Chicago by Mr. Mathias, corporation counsel, speaking in behalf of the mayor; by R. H. Aishton, vice-president, Chicago & North Western, and by Walter Allen, president of the Track Supply Association. In his remarks Mr. Aishton particularly emphasized the importance and responsibility of the track department in the efficient and economical operation of the railways, stating that over $1,100 was spent for labor and almost $900 for materials every minute by the track departments of railways of the United States. Past-presidents T. Hickey (M. C.); J. A. Kerwin (C. P. & St. L.); James Sweeney (C. & E. I.); T. Thompson (A. T. & S. F.); A. M. Clough (N. Y. C. & H. R.), and W. Shea (C. M. & St. P.), spoke on various activities of the association, emphasizing the value of the association in general, and particularly the discussions to track men.

The officers of the association for the past year were: President, T. F. Donahue (B. & O.); first vice-president, C. H. Gruver (C. R. I. & P.); second vice-president, B. C. Dougherty (C. M. & St. P.); secretary and treasurer, L. C. Ryan (C. & N. W.). The reports of the officers reflected the healthy condition of this association, 170 new members having been received during the past year, the largest number for any similar period in the history of the association, while the total membership now exceeds 800. The financial statement was equally encouraging, the report of the treasurer showing a balance of $1,075 on hand.

The following committee reports and discussions were presented at the four days' sessions:

NEW AND IMPROVED TRACK TOOLS

During the last 20 years, our track has increased in weight 37 per cent. With this increase in weight of track the unit load hauled over it has in some instances increased over 300 per cent, which in turn has increased our work proportionately. When we had light rail and few ties to the rail, four or five men could line track. Today it takes six or eight and sometimes more. In maintaining the track under light power it was only necessary to go over the track twice during the summer and it was in good shape; today under heavy power if track is maintained as good as formerly it has to be re-surfaced almost continuously. Accordingly it is plain that if our work is as nearly complete at all times, as it should be, it would require twice the number of men now apportioned for each mile of track.

In order to diminish the necessity of putting on this many men we urgently recommend the more general adoption and installation of power driven machinery and tools for all kinds of work pertaining to the building and maintaining of tracks.

Section Motor Cars.—The use of section motor cars is considered by the committee an important development toward increase in efficiency. There have been diverging views existing among some railway men concerning the advisability of installing motor cars on sections and while their use may not be equally advantageous on all territories it is evident to the committee, after careful investigation and actual experience by some of its members in the use of these power driven cars, that there is absolutely no doubt of the economy and advantages in their use as the following illustration will show:

Price of one hand car	$36.00
Labor cost to run hand car 12 mi. per hour, 5 men and foreman	$0.0906
Depreciation and wear of car	.0006
Total	$0.0912
Motor car	$200.00
Fuel, including repairs, per mile	$0.0173
Depreciation and wear of car per mile	.0034
Men's time, including foreman, riding on car 20 miles per hour	.0505
Total	$0.0712

This is a saving of $0.02 per mile in favor of the motor car.

In view of the above facts, we recommend the adoption of motor cars instead of hand cars, on the same basis of foremen and men now allowed, as experience shows that greater efficiency and long hours of work are secured and men are more easily obtained on sections where they now have been installed, and, therefore, their adoption will help to a certain degree to increase the amount of work accomplished per day per man.

Ballast Cars, Unloaders and Spreaders.—In the handling of large quantities of ballast or waste material on improvement work, the use of specially designed unloaders and spreaders is recommended.

Rail Handling Machines.—There are a number of these machines now on the market and we do not feel that any certain make ought to be recommended as the local conditions should be the main factor in deciding the design most suitable. In order to prevent tieing up too much capital in machinery, machines suitable for different kinds of work should be adopted. Where heavy ditching has to be done in the spring and autumn, machines that can be utilized for ditching and handling rail should be assigned, while in territories where ditching is very light machines operated by air seem to answer the purposes more suitably, but under all conditions rail should be handled by power driven machinery, as this kind of work can be done at a cost of 50 per cent less by power than by manual labor.

Rail Benders and Curvers.—We recommend that when we find it necessary to curve the rail, it be done at the mill. We also recommended the use of the lightest rail bender that will kink the rail used.

Rail Laying.—The relaying of rail is one of the big jobs we all have to contend with during the summer. It requires a large force of men at the present time and, no doubt, even larger ones in the future as all our work has to be done in such a manner that there shall be no detention to traffic. Accordingly it can easily be seen that more or less time must necessarily be lost while the gang is waiting on trains. If, however, machines were substituted so that rails could be laid with a smaller force, a great saving in the cost per lineal foot of track laid would thereby be obtained. There is now on the market a machine known as the "three men" track layer that has been tested and approved by practical track men. We recommend the general adoption of such labor saving devices.

Snow Handling Machinery.—Keeping the track, particularly the switches and interlocking apparatus, in a serviceable condition during severe snow storms, constitutes a heavy item of expense on the railroads of the northern states. Large size snow plows are indispensable in cold climates, the rotary plow equipped with flangers proving most satisfactory. All snow car equipment should have the flangers operated by air.

In busy and complicated yards and terminals where train movements are frequent, it is a physical impossibility to keep the switches in an operative condition by the hand method of

cleaning. The unskilled laborers hired to assist in such emergencies do not and cannot understandingly perform the duties required of them. Therefore, any labor saving appliance that will minimize the danger to the men and effectually keep switches in operation should receive earnest consideration.

From experience it has been found that the method of cleaning snow from switches by chemicals is more effective than any other. The switches, intricate mechanism of interlocking, etc., in busy yards by this method are kept in working order by the regular, experienced forces during the heaviest snow storm. This method consists in melting the snow by pouring the chemical upon it. It is applied to switches by hand distributing cans which hold about 3 gal. The cans have a long spout of ⅜-in. pipe and a valve. The opening at the end of the spout is 1/32 in. diameter and the spout is wrapped with asbestos for several inches from the end. This method is very efficient in removing snow from the intricate mechanism of interlockings, switches, slip crossings, etc. It is estimated that the efficiency of a man at interlockings is increased 200 to 300 per cent by using the chemical cleaning method.

Ditching Machinery—The thorough draining of road bed is the first and most important thing to be done in order to obtain good track. To obtain this different methods have been used, but practically all of it is done by manual labor. This is a slow and expensive process, especially when trains are frequent and work trains have to spend most of the time in sidings.

Suggestions have been made to do the ditching by the use of wheelbarrows and ditching cars. This can be done to good advantage if ditching is done to a side cut or short through cut where material removed can be wasted at the end of the cut over an adjacent embankment, provided there is no place in the vicinity where the road-bed does not actually need to be strengthened. In most cases the roads that have heavy ditching also have very narrow fills. Therefore, material should be hauled to these places and the ditching should be done by machinery, in order that the biggest quantity that possibly can be moved in a short time will be removed from cuts while the work train has the main track. There are on the market for this purpose several machines, all of which are good.

Miscellaneous.—Under this head almost every tool used in maintenance work could be mentioned. In passing we might speak of lining jacks, ratchet track wrenches, tie adzing and boring machines, appliances for drawing screw spikes, etc. There is also a possibility of installing pneumatic tools in our department. In nearly every yard of any size on all railroads, air power is distributed for the use of the motive power and car departments. When air will drill steel plates on cars and engines, why can we not drill rails? When air will drive rivets, why can it not drive spikes? When air will lift cars and engines, why can it not be utilized in jacks for lining tracks, etc.?

J. W. DAHL (N. Y. C. & H. R.) Chairman.

Discussion.—In opening the discussion, the chairman stated that in throwing track, men will ordinarily be distributed at intervals of 2 ft. along the track. A 2-ft. section of track weighs 182 lb., while the resistance against throwing laterally is 10 times this amount or 1,820 lb. The average man can lift his own weight, or 142 lb. With a lining bar he can lift four times his own weight or 568 lb. He also deprecated the tendency to install motor cars as a substitute for section foremen, stating that the foremen have all they can do and that increasing the length of sections adds to their duties and decreases their supervision and efficiency in direct proportion.

In discussing the benefits derived from the use of motor cars, M. Donahoe (C. & A.) stated that he did not believe motor cars would make as great mileage during their life as hand cars. He also called attention to several types of engines which can be attached to hand cars at an initial expenditure considerably less than the $200 referred to in the committee report. W. F. Muff (A. T. & S. F.), stated that while he has several such cars on his sections, his company does not allow the men to purchase their own cars, but that if they are considered advisable, the company purchases the engines and mounts them on the hand cars. Other members stated that their roads allowed the men to purchase their own engines and mount them on the hand cars if they desired.

P. J. McAndrews (C. & N. W.) believed one of the obscure benefits he has secured from motor cars lies in the fact that while it has not been practicable for him to reduce his forces with the adoption of motor cars, he has been able to avoid the necessity of increasing forces during the past two years in spite of the continually decreasing efficiency of labor. While unable to show exact figures, he believed that on sections employing seven or eight men, motor cars effected a saving of one man in each gang.

J. Buel (Ark. Cent.) stated that he has used motor cars for five years, eliminating alternate sections. The hand cars were kept for use when the motor cars were in the shops for repairs, but it has been found that whenever a gang was required to go back to the hand car, the laborers left. J. P. Corcoran (C. & A.) also stated that his laborers tend to move from sections equipped with hand cars to adjoining sections supplied with motor cars and that he has no trouble keeping these latter gangs to their desired quota. On the other hand, W. F. Muff stated that the Mexican laborers employed on his division complain about the increased hours of labor now spent on the track where motor cars are used.

The consensus of opinion was that motor cars should be strongly recommended, but that no sections should be eliminated. Some opposed their use on lines with many curves or heavy traffic, while others reported using them safely on such lines. L. C. Ryan stated that during June and July, 1914, the North Western paid $35 per minute for track labor. If the motor cars saved only 20 min. per day for these forces the economy is evident.

In the discussion of rail handling machines there was a diversity of opinion regarding the type best suited for different conditions. D. O'Hern (E. J. & E.) stated that he uses a locomotive crane with a magnet in loading scrap, this machine picking up twelve 33-ft., 100-lb. rails at one time. It is also used to pick up angle bars, bolts and spikes. It is used principally in yards where the ordinary air or steam-operated rail loaders are too slow.

There was also a wide diversity of opinion regarding the necessity for curving rails. The committee report originally advocated curving all rails for curves of 6 deg. and over. T. Hickey (M. C.) advocated curving all rails for curves over 3 deg., stating that he has found that rails properly curved will stay in line as well as on tangent. D. O'Hern, H. Van Gorder (C. & N. W.); M. Burke (C. M. & St. P.), and others opposed the curving of rails for all curves less than 10 deg., believing that money so expended is wasted and that the necessity for curving rails for such curves has disappeared with the gradual change in the practice of laying rail with broken rather than square joints. It was finally voted to amend the report to recommend that where necessary to curve rails they should be curved at the mills.

C. King (L. I.) and A. M. Clough (N. Y. C. & H. R.) described the operation of a type of tie tamping machine, 12 of which are now in use on the New York Central. This machine is mounted on a push car, is self-propelled and is driven by a gasolene engine operating an air compressor. It works similarly to a riveting machine with two tampers having a stroke of about 1½ in. This machine requires two men to operate it and will tamp 350 to 450 ft. of track per day, replacing 10 men.

PROPER METHOD OF RAIL RENEWAL

The roadmaster or supervisor of track who is in immediate charge of a division should be the one to recommend when rail should be renewed. He sees it under all conditions; sees it either too light or gradually deteriorating under traffic, and knows from year to year just how much more difficult and expensive it becomes to maintain it. The question of the weight of the new rail to be laid should be determined by the chief en-

gineer or other official conversant with the probable increase in traffic or tonnage or acceleration of speed contemplated over that district which is not always known to the man in charge of the track.

Rail should be laid as early in the spring as possible, weather and other conditions permitting. It should be furnished from the mills on flat cars when practicable and all full length rails should be loaded separate from short lengths.

Rails loaded in gondola cars should be unloaded with a power unloader operated by air or steam as provided. Rail can be unloaded with skids from the side of the car or by pulling them off from the ends of cars with an incline arrangement to permit the rail to reach the ground easily, the main object of all concerned being to use care so that rail will not be injured while being unloaded.

Rail should be laid with broken joints. In laying rail around curves, rails cut from 6 to 12 in. shorter at the mills should be used on the inside of curves so that a joint on the inside rail would never get more than from 3 to 6 in. ahead of the center of the opposite rail until a short rail is put in. Any extra effort to keep joints properly broken is fully repaid in the proper spacing of ties on curves, one of the most vital points.

Rails shorter than the standard lengths should be marked green on the ends, except those cut special for curves, which should be marked red. All second quality rails should be marked white. Full length rails, of course, do not need to be marked.

Where conditions permit rail should be laid in track one rail at a time and great care should be used to see that they are not bumped against the last rail laid in. Proper expansion shims should be used to keep the rails the right distance apart according to the weather conditions. The shims should be made of hard steel. Rails of the same width of base should be laid from the inside which will permit the ties to be adzed and rail set up level without interfering with outside spikes, and all bad spikes should be renewed.

If a rail with a wider base than existing rail is being laid, one rail should be laid from the outside and one from the inside with the same care in adzing ties so that the wheel will tread the full width of the head of the rail as in laying from the inside. The track should be put to true gage when the rail is laid.

When the proper tables for expansion are not given the tables recommended by the American Railway Engineering Association should be used. This table is herewith given with a slight variation:

20 deg..... 5-16 in.	80 deg..... 1-8 in.
40 deg..... 1-4 in.	100 deg..... 0 in.
60 deg..... 3-16 in.	

No rail should be laid in temperature below zero.

A foreman laying rail should be provided with a thermometer to enable him to know what the temperature is and to use expansion shims accordingly and he should also have a steel tapeline to check frequently the positions of his joints and understand the importance of keeping the joints uniformly broken, without which uneven spacing of ties between joints and unsightly and improperly laid track will result.

Three or four bolts in a joint, properly tightened up during the day while laying operations are going on, are sufficient to permit traffic to go over, but all joints should be full bolted and bolts made reasonably tight and all spikes driven down before quitting work at night.

The practice of using switch points to make temporary connections while laying rail is gradually losing favor and the safer way of having compromise joints made to fit both sections of rail that are being handled is recommended, having in mind, of course, to do the least cutting of full length rails possible. The foreman should carry forward with him the portions of the first cut rail and while laying rails longer than the existing rails or where rails run away from the old location of joints, he can always make his closure where a shorter rail will answer until the full rail is used up.

As the proper expansion between the new rail being laid nearly always varies from that being taken out, rails should be laid without regard for holding the joints on the old joint ties and enough rail anchors used to hold it from creeping until the ties are spaced and the joint ties properly spiked. It is also recommended that a sufficient number of rail anchors be used permanently, according to conditions, to keep the rail from creeping, the idea being that in the past too much was expected of the only way we had of holding the rail, viz.: the slots in the flanges of the angle bars.

Ties should be spaced as may be required and all defective ties renewed and track properly surfaced, gaged and lined as soon as possible after the rail is laid. All bolts should be tightened to as near the same tension as possible—a most important feature in getting the best results from new rail, as nothing so effectually destroys or nullifies the good work of a foreman in getting rail laid with the proper expansion than to have some joints tight and some loose, the heat or cold always pulling the rails apart or closing them up where there is the least resistance. No poor spikes should be redriven.

In handling relayer rail the same general methods should be used; in addition care should be taken not to relay any poor rail or worn out joints. The proper place and time to guard against this is when the rail is being removed from track; flaws are easier detected then and the condition of joints is more readily seen.

Rail laid near depots or water stations where trains stop and start will be worn down more than out in the open and this rail should either be kept together or culled out entirely. All good rails from one side should be loaded on the same cars and as near in rotation as possible and unloaded the same way, so as to put the rails back in as near the same relation to each other as possible.

Great care should be exercised to see that rail is properly in place. When a new rail is laid where an old joint was slightly low, it should be tamped or blocked up to prevent it being surface bent by the first train over it.

There are many other details that the foreman who is considered capable of handling a rail gang will see to of his own accord. The organization of his gang, the rules of flagging, the time of day to run rail and the amount that can be well and safely laid, can reasonably be left to him and the prime object should be, not how much can be laid, but how much can be well laid and with the least interruption of traffic or anxiety to the officers who are immediately responsible for its proper laying and maintenance and with the results that the higher officials expect from the money expended.

The following is an outline of an arrangement of a steel gang of 58 men:

Two men, one flagman in each direction at all times when gang is at work; two men, taking up and putting down crossings and handling insulated joints; one man, with hand car, handling tools, switch point, rail bender, etc.; four men pulling spikes; three men throwing in old rail; ten men adzing ties; twelve men lifting in new rail; two men barring in new rail; two men spiking joints and quarters; four men spiking; one man adzing ties for new joints; six men or more putting on new joints and wrenching; one man removing expansions shims; four men throwing out old rail; one man carrying water; one foreman of the gang; two assistant foremen, and one time keeper.

A. M. CLOUGH (N. Y. C. & H. R.), Chairman.

Discussion.—The extent to which rails should be allowed to wear before being renewed aroused discussion. Several members stated that rail worn out is evidenced by the increased cost of maintenance to keep the track in proper condition and also by the increase in the number of breakages. There is no rigid line of demarcation between safe and unsafe rail. J. P. Corcoran (C. & A.) called attention to the economy in transferring rail from main to branch lines before it has been entirely worn out in main line service, the effect of this being to decrease the cost of maintenance on both main and branch lines.

In reply to a question, Chairman Clough stated that one important advantage of laying rail in the spring is that the more

uniform temperature enables the rail to be laid with less difficulty from expansion. It is also possible to get more work from a gang of men at this season.

To expedite the unloading of rail along the track, J. P. Corcoran stated that he has transferred rail from coal cars to flat cars with a rail loader in a yard at a cost of $2.10 per car. W. Shea (C. M. & St. P.) defended the shipment of rails from the mills in stock cars as practiced on many western roads, because of the ultimate economy to the railroads in reducing empty car mileage. He also stated that he would rather load released rail into stock cars than on flat or gondola cars as there was less danger of injury to the men.

G. H. Prentice (L. S. & M. S.) stated that he has found difficulty in preventing the tongmen from bumping the adjacent rails and closing up the expansion so he leaves several shims between the last rails laid. A. M. Clough stated that he avoids this by setting the rail on the ties close to the old rail and moves it laterally into its final position.

In discussing which line of spikes should be removed, W. Shea stated that he has found ordinary spikes on the outside of the rail to be badly corroded and cut whenever the rail required renewal and he did not believe it advisable to allow such spikes to remain in the track. He advocated pulling all spikes, which is, of course, necessary when tie plates are used.

While it was the general opinion that rails should be laid singly as recommended by the committee, M. Griffin (C. R. R. of N. J.) stated that on his subdivision it is impossible to secure the use of the track to exceed 15 to 30 min. at a time. Under these conditions he bolts up 100 rails on the ends of the ties, bonding all but the last joint and throws this stretch in at one time. On curves he places 25 to 30 rails in a string. Expansion is maintained by holding the shims in position until the rail is in place and spiked.

The original recommendation of the committee that ties should be spaced immediately after the rail is laid, aroused a vigorous discussion. L. C. Ryan (C. & N. W.) stated that he had recently examined a New York Central track where care is taken to secure a supported joint. He had also studied the Pennsylvania track where a suspended joint is used and had gone over the Lehigh Valley track where either suspended or supported joints are used without the spacing of ties and found that all this track rode well. He therefore questioned the necessity of spending a large sum of money to secure a standard spacing of joint ties. W. Shea stated that anchoring the rail to the joint ties loosens these ties and mainly for this reason, the St. Paul has abandoned slot spiking the joints and the spacing of joint ties. They have found that rail can be fully anchored on intermediate ties, although this requires a special joint tie plate. With these tie plates he has found that rail can be laid and maintained on single track much cheaper than where the ties are spaced. P. Madden (C. M. & St. P.) stated that he had found the same results on double track. Other members spoke of the practice of the Michigan Central and Lake Shore along the same lines, the former road having abandoned the spacing of ties when laying rail on some divisions for the past three years. While other members strongly opposed this practice, the association decided to amend the report as printed above.

The original recommendation of the association that rail in double track be laid in the direction of the traffic was also attacked. M. Donahoe (C. & A.) stated that he had found that rail could be laid better against the traffic. A. M. Clough stated that on the other hand, when laying rail with the traffic on a road equipped with block signals, there was less danger of a train running into open track. W. F. Muff (A. T. & S. F.) stated that until this year it had been his practice to lay rail with the traffic. During this season he has laid rail against the traffic and finds that it creeps less. He also believed that there was less danger of accidents when using point connections. T. Thompson (A. T. & S. F.) and P. J. McAndrews (C. & N. W.) stated that they are able to maintain the expansion better when laying rail against the traffic. A. E. Muschott (E. J. & E.) stated that he has laid rails both ways and could see no difference in the results. M. Griffin (C. R. R. of N. J.) stated that it is the practice on his road to lay rail with the traffic. No switch points are used at connections but rails are cut as required, and it has been found that when laid with the traffic the new rail is not battered at these connections.

PROPER ORGANIZATION AND ECONOMICAL USE OF LABOR AND MATERIAL

Additional supervision has been provided in all other departments of our railways as the need became apparent, but on many important roads we find today practically the same scheme of track organization as existed as much as 40 years or more ago. It would seem the time has arrived for careful consideration of the needs in the track department for such supervision as will guard against waste.

Under the organization in effect on some lines, where the division superintendent has the division roadmasters or supervisors immediately under him, it is thought that some measure of efficiency is lost because often the superintendent is not familiar with track matters and especially so during the early years of his experience as superintendent before he has had opportunity to study and absorb some of the essential principles of track maintenance.

Each division has a master mechanic under whose direction road foremen of engines, traveling foremen and various inspectors are employed to supervise the men and machinery, a master car builder whose business it is to keep the cars in condition to handle the traffic, trainmasters and their assistants to instruct and direct trainmen, each of those mentioned being a specialist in his line. There should therefore be an experienced trackman at the head of the track department on each division whose knowledge properly applied would enable his company to get maximum results from all money expended for material and labor used in track maintenance.

No plan of organization can be worked out that would exactly fit conditions on all railways nor perhaps on all divisions of any large systems, but the following proposed plan with modifications might be found suitable for many of the principal lines with heavy or medium traffic.

Division Superintendent or Division Engineer.
Division or General Roadmaster.
Roadmaster or Supervisor.
General Foreman.
Extra Gang Foreman.
Section Foreman.
Student Foreman.
Laborers.

A general roadmaster should have jurisdiction in the same district as his division superintendent. On heavy divisions, roadmasters should have districts not exceeding 50 miles of double track or 100 miles of single track while on lighter divisions through prairie country 125 miles should be the maximum length of district.

All records should be kept at the office of the general roadmaster and the district roadmasters should only conduct such correspondence as may be necessary to direct the work of the foremen, a sufficient force to be employed at the office of general roadmaster to keep the necessary accounts showing expenditures for material and labor with correct distribution thereof to the various prescribed divisions of charges. Through the elimination of office work, the district roadmaster would be in a position to spend the greater portion of his time out on the line among his foremen and laborers, giving the personal supervision and instruction which is essential to efficiency.

A general roadmaster should exercise supervision over his assigned territory, carrying out the policy of the management, distributing to his district roadmasters, necessary material and making such allowances for labor on the various districts as conditions warrant, placing the material and labor to the best advantage. Necessary general instructions to roadmasters should be issued from his office, proper data for cost records should be secured and worked out to determine the efficiency of those employed under him and a careful survey should be

made of conditions on the various roadmasters' districts at frequent intervals.

All pay rolls, vouchers, requests, etc., should be carefully scrutinized and a system of checking be adopted to insure the accuracy of all time rolls.

District roadmasters should devote their entire time to the supervising of the work being done by the various extra gangs, section gangs or other crews employed in track work on their districts, looking after all material to avoid any waste. They should carefully watch the work done by all foremen and promote the most efficient men to better positions as opportunity is presented.

General foremen should report to the district roadmasters working under their instructions, spending such amount of time with the various extra gang and section foremen as will secure maximum results in safety and efficiency and should pay special attention to the instruction of foremen with least experience.

Extra gang and section foremen should render all accounts of material and labor to general roadmasters and work under the direction of the district roadmaster and the general foreman.

Student foremen should work on the section or extra gangs under the immediate direction of the foremen and be given instruction and opportunity to become familiar with the work, so as to fit themselves for promotion to the position of foreman.

The maximum length of sections should be 3½ miles of double track or 6 miles of single track, and where a number of sidings or yard tracks are included, the length of sections should be reduced correspondingly.

Forces should be assigned to the various sections based on the number of miles of main track, miles of sidetracks, industry tracks, interlocking plants, extent of station grounds, number of highway or street crossings, etc., on each section. The number of laborers that should be assigned to sections, depends largely on the physical characteristics of the line, the amount of traffic handled and the degree of excellence or refinement desired by the management.

Thus far organization has been discussed only as it pertains to supervision, but unless the standard of track laborers can be raised, all efforts to increase the efficiency of the supervising officials will amount to but little. In order to compete with other industries in securing laborers, a reasonable rate of compensation should always be paid with an "all year round" program of work for extra as well as section gangs, and the majority of laborers should be retained in service continually.

The general practice at present on most systems is to reduce section forces to the minimum and dispense entirely with all extra gangs about the time of the first frost and tie up track maintenance until the following May or June. This practice of all the railways trying to do their year's work in a few months creates an abnormal demand for labor during the short season and makes necessary the payment of much higher wages than would be the case if men were steadily employed and the work spread out over the year. The cost of additional supervision recommended above would be more than saved if the men were kept all the year round as in this way a great many local laborers could be secured for section and extra gangs, dispensing with the inferior class of foreign laborers that must be used during the short season of track work.

Where it is necessary to use foreign laborers, good facilities for the men should be provided, with necessary attention to sanitary conditions and an endeavor should be made to educate the foreign laborers in a manner that will result in their becoming better citizens.

It is suggested that an all year round program of work would result in a reduced cost of material, such as rails, fastenings, tie-plates, rail anchors, frogs, switches, etc., for the same reasons that economies for labor could be shown. A more uniform demand for materials would enable the various mills and foundries to produce a more regular output, thus employing a nearly uniform force of men steadily rather than increasing their output spasmodically during the summer months as at present. If this improved practice would not result in a reduced price for track supplies, it would at least tend to improve the quality. General roadmasters with a program of work covering all or nearly all the year would be in a position to give the stores department advance notice and get materials in such quantities and at suitable times to avoid accumulation of large stocks.

P. J. McANDREWS (C. & N. W.), Chairman.

Discussion.—The discussion was devoted mainly to that portion relating to the proper length of roadmaster's and section foremen's territories. It was generally agreed that these present limits are too great for best results and that the recommendations of the committee, if followed, would improve conditions. The committee's suggestion that a general roadmaster be appointed on those divisions with three or four roadmasters, also met with general approval, the advantage being pointed out that this general roadmaster could so correlate and distribute the work of the different roadmasters on the division to secure the most economical operation of work trains and extra gangs and the distribution of material. C. King (L. I.) described the practice of his road of employing track forces on a yearly basis, which was described in the *Railway Age Gazette* of October 24, 1913, and March 13, 1914.

PROPER TYPE OF TRACK ACCESSORIES

Rail-Joints.—A plain four-hole angle bar joint, 24 in. long, with sufficient weight and proper distribution of metal, in accordance with the rail section it is applied to, to best resist deflection, is recommended. The bolts for 90-lb. rail section should be one inch in diameter, U. S. standard thread, with a good make of spring nut lock, square head tap, staggered in joint. Where traffic is very dense and heavy a separate plate is recommended. This base plate should be about ⅜-in. thick, 2 to 3 in. wider than the angle bar, turned up at ends of angle bar, and might also have a longitudinal rib under center of plate to act as a strengthener or truss for additional support under the rail ends. Base plates can be eliminated where the traffic is light.

Switches and Manganese Separable Points.—For split switches in common use the reinforced point is recommended, with length and planing in accordance with the length of lead or angle of frog it is commonly used with.

For plates we recommend a ⅝-in. Gage plates should be about 6 in. long, by 6 in. or 6½ in. wide and not less than 9-16 in. thick, insulated where necessary and turned up at each end to form a shoulder for a rail brace. The slide plates should be at least 9-16 in. thick, 6 in. wide and 12 in. long for plain plates and 20 in. long for brace plates with a riser three to four inches in width, rolled or planed and a shoulder for a brace to be applied against. This brace should be a separate part of the plate punched and fitted to spike through the brace and plate. These plates should be on every other tie from the gage plate at switch point to heel of switch, every other plate to be plain. Special tie plates without braces should be used commencing with the joint tie at heel of switch and extending some four ties from the heel of switch to a point where the regular tie plates can be applied. These long special plates should be properly spike-punched for the road's standard turn-outs, the spike-punching for turnout rail to be made large enough to care for a ⅝-in. variation in line.

For a heel joint, it is recommended that a 20-in. cast heel block filler be used. It should be made to fit snugly between the joint and traffic rail, bolted through the block filler and joint to an angle bar on the gage side of the point independent of the traffic rail. The bolt heads should be countersunk in the cast filler block so the latter will set up snug against the traffic rail, answer for a foot guard and be free from creeping of the traffic rail under one-way traffic.

For yard use, at inside switches, where work is heavy, we recommend the manganese separable switch point. The cutting or sawing off of worn points and applying the manganese point should be done at terminal roundhouses where there is a blacksmith employed and at local shops when they are not too far distant. The stock rail supporting the turnout point in switching

yards and at all inside switches should have the double kink to protect the switch point from excessive wear and to prevent the switch from being split by a wheel flange on account of a loose-fitting switch point. We do not recommend a switch point shorter than 12 ft.

Crossing and Other Frogs.—The committee recommends the solid manganese frog for crossings, other than where the traffic is light and the wear in either direction only moderate. In frogs where the inserted manganese filler is used, the common steel rail should join onto the manganese with a square cut end, and in such a manner that the track-men can renew the section of common rail should it become necessary. We also recommend solid manganese rigid frogs in all terminals, on busy switching leads, and where the Bessemer or open hearth rail would wear out in less than one year. Manganese crossings for steam railroads should be made up in two or four sections, depending upon the angle. The outside arms should be made as short as possible for better service as well as saving in material.

For rigid frogs of planed "T" rail, we recommend the cast filler bolted frog with spring nut lock and square head lock nut, bolts to be of Mayaria heat treated steel. Rigid frogs of a flat angle can be used right and left hand, by having the short point on turnout side of frog, turnout rail at toe of frog to be enough longer than the lead rail, or tangent rail of frog, to square the switch points at head block when enclosure rails of same length are used between frog and switch.

Spring rail frogs should have tie plates attached in accordance with proper tie spacing, except under joint ties, at the heel and toe of frog, where special detached plates should be used, slot punched to mate with gain holes in the angle bar joints. An anti-creeping device should be used about midway between throat and joint at toe of frog. The rail for a sufficient distance back of all spring rail frogs, on one-way traffic, should be securely anchored with anti-creepers to prevent rail from crowding the frog, or wing rail of frog.

Switch Stands.—The committee recommends the automatic switch stand for use on main line switches about yards and terminals where the switch is subject to being run through, as well as to operate all busy yard or inside switches. We recommend round holes in the base of switch stands instead of square ones with the stand fastened to head blocks with ¾-in. lag screws instead of spikes. When fastened with screws an adjustable connection rod should be used.

Guard Rails and Fastenings.—The committee recommends an eight-foot guard rail, curved out at the ends to a clearance of five inches from the traffic rail. The ends of the guard rail are to be bolted through a cast filler to the traffic rail with one large size bolt (1 in. for a 90-lb. rail). This cast filler is to serve as a foot guard as well as to help hold the guard rail secure. A good make of guard rail clamp is to be applied at center of guard rail or opposite throat of frog. Tie plates should reach under both guard rail and traffic rail, slotted for spiking on outer side of traffic and guard rail. The guard rail should be planed on inner side sufficiently to permit it setting up to the proper clearance for flangeway. In placing this style of guard rail, set the center of the guard rail opposite or at right angles to the throat of the frog, or just ahead of the theoretical point of the frog.

Tie Plates.—This committee recommends a wrought iron plate, 6 in. by 9 in. by ⅜ in for 5-in. 80-lb. rail, with a shoulder for the outside flange of the rail, punched for two spikes on the gage side of the rail and one spike on the outside of the rail. Tie plates should be used on all curves, on all soft wood ties on tangents as well as on curves and on all ties where traffic is heavy.

Anti-Rail Creepers.—The boltless, self-maintaining, wedge, skew, spring or clamps, in our opinion, is the best type of anti-creeper on the market.

Nickel chrome steel frog, crossing and track bolts, screw spikes, and the "frictionless" rail were also discussed at length in the report.

M. DONAHOE (C. & A.), Chairman.

Discussion.—In discussing rail joints, some objection was raised to the recommendation that base plates be used and there was considerable difference of opinion as to the value of joints of this type. It was finally decided to receive the section on rail joints as information.

Speaking on the second paragraph of the section on switches and manganese separable points, A. E. Muschott (E. J. & E.) objected to gage and slide plates less than ¾ in. thick on account of their liability to buckle under heavy traffic. Several members spoke in favor of plates with double shoulders, one for the rail and one for the brace. A number of other minor suggestions were adopted in this paragraph.

Referring to the recommendation of the committee providing for three hold-down devices on the spring rails of frogs, B. C. Dougherty (C. M. & St. P.) stated that he has found that two such devices are not sufficient. T. F. Donahue (B. & O.) referred to the difficulty in renewing bolts on spring frogs without cutting the frogs apart. To eliminate this difficulty the report was amended to add that "the design of spring frogs should be such that the wing rail may be removed to permit bolts to be renewed."

The recommendations of the committee with regard to the adoption of automatic switches created a spirited discussion. Referring to yard work, J. W. Guffey (S. A. & A. P.) stated that he has found that switching crews would run through automatic switches rather than to stop to throw them for the desired track and has had much difficulty in breaking up this practice. D. O'Hern (E. J. & E.) has installed automatic switches in one yard so that the switch engines can run through them without stopping, facilitating their work. M. Burke (C. M. & St. P.) vigorously opposed this practice, believing that automatic switches were never intended to be run through, but were designed to prevent damage when a switch was run through accidentally. He did not believe a stand would endure such service for any length of time.

There was an even greater division of opinion regarding the advisability of installing automatic switches on main tracks. B. F. Brown (B. & M.) stated that automatic switch stands are used exclusively on main lines on his subdivision. Other men opposed them and some roads were reported to forbid their use in such locations.

W. Shea (C. M. & St. P.) objected to the recommendation of the committee that guard rails should be bolted or clamped to the main track rails. Where such bolts or clamps are used he has found that they will loose the spikes holding the main rail, resulting in derailments. He pointed out the necessity for a better device and advocated as one solution, a guard rail independent of the running rail. T. F. Donahue (B. & O.) avoids difficulty with derailments by placing heavy tie plates under the guard rails and running rails and applying from two to five rail braces to each guard rail. M. Donahoe (C. & A.) advocated short guard rails, believing that a length of over 10 ft. was detrimental and that the shorter length was sufficient to guard the point.

The committee's recommendations for size of tie plates were attacked and after considerable discussion it was decided to amend the report to recommend that tie plates be used with a minimum thickness of ½ in. and of a width equal to that of the standard tie.

CLEANING AND POLICING THE RIGHT OF WAY

On some eastern trunk lines the right of way is given the same care as the tracks. The weeds and grass are kept cut down at stations each week and papers and refuse dropped from trains are picked up each day.

In the Middle West the right of way should be mowed of weeds and grass as soon after July 1 as possible, or sooner where weeds will go to seed before this date, to prevent fires from spreading into wheat, oat and hay fields which annually cause heavy losses to the railroads. Where the ground is level, the

right of way should be cut with a mower and team, paying from $8 to $10 per mile.

As soon as the weeds and grass are dry the section men should go over the ground and burn off the right of way, either by placing a piece of waste at the end of a wire and drawing it over the right of way cut, or by using a 2-in. pipe, 8 or 10 ft. long, filled with waste and soaked in kerosene oil. This pipe has very small holes bored in it to allow fire to work from the oil in the waste. In burning of right of way great care should be exercised by the section foreman to do the work when the wind is blowing from the field, to prevent the fire from getting away from the section gangs. Every vestige of old wood, trees and other rubbish should be burned while cleaning the right of way.

Rail.—New or relay rail, when unloaded, should be properly distributed and not scattered along the right of way on the ends of ties or down in ditches but should be set off the ends of ties onto the ballast. As soon as the new rail is laid the old rail should be unbolted and loaded as soon as possible to be taken to headquarters or to points where it is to be used. Every vestige of scrap, such as old bolts, spikes, short pieces of rail, old frogs and switches, should be picked up by the rail loader and the right of way should be left clean. It is much cheaper to load rail with a rail loader than by hand with section labor and at the same time injury to laborers is avoided.

Ties.—Ties unloaded in the fall and winter for next season's work should be piled in accordance with the standards, the piles set at certain distances, so that the section forces will not have too long a haul in distributing them for spring work. These ties should be set up out of ditches on high ground so that spring freshets will not wash them into openings of bridges and block the water, thus causing it to go over track.

All treated ties should be covered with two inches of dirt to prevent them catching fire and weeds and grass should be cleaned away from each pile of ties to prevent fire and give it a tidy appearance.

When ties are distributed on outlying sections they should not be placed between tracks as this might invite boys or mischievous persons to place them on the main track. Ties used in yards should be distributed as used. Old ties removed from track should be picked up each night and not allowed to remain between tracks to cause some switchman or trainman to be injured.

Where practicable ties removed from tracks in cuts should be hauled out of the cut for burning. If burned in the cut the dirt is likely to wash down and fill the ditch. Foremen should be working close to the spots where ties are burning to prevent fires spreading to adjoining fields and also to see that all ends of ties are properly burned.

Scrap.—All track scrap such as old spikes, bolts, splices, rail and frogs, should be picked up at the close of each day's work and taken to the scrap pile. Crooked or bent spikes should be sorted out and set in tool house and on rainy days the section gang can straighten them and use them in side tracks. Old bolts picked up should be sorted over and bolts found good for use in side tracks should be oiled and nuts placed on them, so that, when wanted, they will be ready for use.

Ditches.—Section forces should watch their ditches and waterways very closely and keep them cleaned out and open. In the fall the section men should go over their sections, clean out all ditches and waterways and, where possible, use the dirt for subgrade.

Ditches to drain the ballast are better than none at all, but they will not aid materially in maintaining good surface. All ditches should be deep enough to properly drain the subgrade. The bottom of the ditch should be from two to three feet below the bottom of the tie, depending on the nature of the soil. Such a ditch, if properly constructed, will keep the roadbed fairly well drained and aid materially in maintaining the surface; and, in addition, will reduce to a considerable extent the liability of track heaving during the winter months.

Particular attention should be paid to drainage at frogs, switches, railroad crossings and street and highway crossings. The remedy depends on the local conditions. This depends, in turn, on the matter of providing sufficient rapid drainage and supplementing it by subdrainage wherever necessary. Blind drains of cobble stone, broken stone, or tile, laid parallel to the track four inches outside of the tie and six inches lower than the bottom of the tie, will carry off the surplus water, avoid the puddling of the joints in crossings and save considerable work and money.

Fences.—Right of way fences should be built substantially with the posts set firmly in the ground and in good line. Corner posts should be well braced and anchored so that fences will not sag. Light convenient gates should be provided at private crossings, and the hearty co-operation of the farmer and land owner should be solicited in keeping those gates closed when not in use. It is economy for each supervisor or roadmaster to have a fence gang of five or six men and foreman, to repair or rebuild fence out of face. In this manner a uniform fence is secured much cheaper than if built by section gangs.

Bridges.—Section foremen passing over bridges and culverts should note their condition and see that they are safe. Weeds should be cut from around all wooden and pile bridges, and taken from under the bridges to avoid catching. All bird's nests in pile trestles or wooden bridges should be removed by the track walker as he passes over the track each day, to prevent the bridges from catching fire from cinders dropping from the engine.

Water barrels at bridges should be filled at intervals; and, in dry weather, where there are long trestle bridges, the local freight trains should be stopped to fill the water barrels.

The Track Walker.—The track walker should be the best and most intelligent man in a section gang. He should be able to read and write and should study the rules of track work and flagging, so that in case he found a broken rail he would know how to flag trains until he could send word to his foreman to come and replace it.

The track walker's duties are numerous. In passing over the section he should examine and open every unlocked switch, switch stand and guard rail each day and know that they are positively safe for the day; he should tighten any loose bolts found; drive down any loose spikes to the rail; change any broken angle bars found; reset, if possible, any planks found heaved up in road crossings which are liable to catch the pilots of engines; watch fences and farm gates as he passes over the track, patch any broken fence wires and close farm gates which are left open. The track walker should keep a very close watch for track spreading and spike it back to gage. If it continues to spread he should call the foreman's attention to it.

Cleaning Around Yards, Freight Houses and Station Grounds.—In cleaning freight yards at terminals the dirt and scrap scattered between the tracks should be gathered up in piles on three or four tracks so there will be no delay to work train waiting for the dirt to be gathered up to load. A work train with 12 or 14 flat cars should then be furnished to load up this dirt the same day it is put in piles to avoid injury to train or switching crews. To handle this material with a wheel-barrow or box is too expensive and dangerous for men working between tracks where cars are being switched.

In cleaning around freight houses a side dump car should be set and litter and dirt cleaned from the cars should be wheeled to and thrown in this car by the freight house employees. A wagon with two wheels that will hold a half yard of dirt should be furnished to freight houses and in that way no rubbish or dirt is allowed to accumulate at freight house tracks. This committee has investigated two railroads where this method is employed and freight house tracks are only cleaned once a year by the section men.

Driveways at freight houses and stations not over 1,000 ft. long should be cleaned by using a wheelbarrow with a car to wheel it on. Where drives are longer a horse with a dump cart should be used to pick up the dirt and take it to a car to load.

All old paper and litter around station grounds should be picked up and burned at least twice a week to give the station grounds a tidy appearance.

Sign Posts.—All sign posts, mile posts, crossing and whistling posts, etc., should be watched closely, kept set up plumb and weeds and grass kept cleaned from around them to give them a tidy appearance.

J. P. CORCORAN (C. & A.), Chairman.

Discussion.—In discussing the proper time to cut weeds, several men preferred doing this work before July 1, and again later in the fall. Chairman Corcoran stated that where weeds are cut in July and the ground then burned over, few weeds will grow to any considerable height that season.

In discussing the subject of drainage, W. Shea (C. M. & St. P.) stated that he would be unable to maintain track in cuts on his division with ditches three feet deep with the heavy motive power operating on that line. He is forced to place a large amount of cinders under the track, to install subdrainage and then to construct shallow ditches.

THE ANNUAL BANQUET

The third annual banquet of the Track Supply Association for the Roadmasters' & Maintenance of Way Association was held in the Auditorium hotel on Thursday evening, with about 200 members of the two associations attending. President Walter Allen of the Track Supply Association acted as toastmaster. In introducing the first speaker, Mr. Allen compared the duties of the roadmaster during recent years with those of the officer who "carried the message to Garcia." He referred to the fact that in spite of reductions in appropriations and forces, the roadmasters were expected to keep their lines open for traffic in times of storm and to keep them safe for operation at all times.

J. A. Spielman, district engineer maintenance of way, Baltimore & Ohio, Pittsburgh, Pa., spoke on the conditions under which the track department is operating today. He referred to the advantages of precedents in methods and variety of appliances the roadmaster now has as compared with 25 years ago and stated that he thought the manufacturers of track appliances might be considered one department of the railways, taking the burden of developing new devices off the roads themselves. Efficiency has replaced the dollar as the standard of track maintenance today and with this in view, he strongly urged that the Roadmasters' Association go on record as protesting against the present limits of the fiscal year.

T. F. Donahue, president of the Roadmasters' Association, spoke briefly on the necessity of the roadmasters spending more time among their men on the track, endeavoring to develop them as track men and to increase their efficiency. He also urged the roadmasters to take more interest in public affairs affecting the railways and to use their influence against adverse legislation.

W. C. Kidd, secretary of the Track Supply Association; E. M. Fisher, president-elect of the Track Supply Association; P. J. McAndrews, president-elect of the Roadmasters' Association, and past president A. M. Clough of the Roadmasters' Association also spoke briefly on various phases of their organizations.

CLOSING BUSINESS

The selection of a location for the 1915 convention aroused considerable discussion between the advocates of Chicago and New York. The vote was so close that on the first ballot, when St. Louis was also being considered, New York stood one vote ahead of Chicago, but did not have a majority. A second ballot from which St. Louis was dropped, showed a slight majority for Chicago. It was then proposed that the selection of Chicago be made unanimous and a motion to that effect was carried. It was decided to hold the next convention the second week in September, 1915, convening on Tuesday, September 14.

The election of officers resulted in the choice of the following: President, P. J. McAndrews (C. & N. W.), Belle Plaine, Ia.; first vice-president, Coleman King (Long Island), Jamaica, N. Y.; second vice-president, M. Burke (C. M. & St. P.), Chicago; secretary and treasurer, L. C. Ryan (C. & N. W.), Sterling, Ill.; W. H. Kofmehl (C. M. & St. P.), Elgin, Ill., was elected a member of the executive committee for the full term of three years, and A. Grills (G. T.), St. Thomas, Ont., was elected to fill the vacancy on the executive committee caused by the election of Mr. McAndrews to the presidency.

P. J. McAndrews (C. & N. W.) suggested that it might be wise to publish in the form of a manual of recommended practice, a resume of the important action taken by the association at recent conventions and after a short discussion, a motion was passed to request the executive committee to consider this matter and act if it is deemed advisable.

TRACK SUPPLY ASSOCIATION

The meeting of the Track Supply Association held in connection with the convention showed that organization to be in a flourishing condition. The officers for the past year have been: President, Walter H. Allen, Pennsylvania Steel Company; vice-president, E. M. Fisher, Fairbanks, Morse & Co.; secretary-treasurer, W. C. Kidd, Ramapo Iron Works, and members of the executive committee, Henry Fisher, Verona Tool Works, and L. P. Shanahan, American Steel & Wire Company. The exhibit in the corridors of the hotel was larger than ever and as in the past, was exclusively an exhibit of track appliances.

At the annual meeting held on September 10, the following officers were elected for the ensuing year: President, E. M. Fisher, Fairbanks, Morse & Co.; vice-president, F. A. Preston, P. & M. Company; secretary-treasurer, W. C. Kidd, Ramapo Iron Works; director for one year, L. P. Shanahan, American Steel & Wire Co.; director for two years, R. A. Van Houten, Sellers Manufacturing Company.

EXHIBITS

The following companies had exhibits at the convention.

Ajax Rail Anchor Company, Chicago.—Double grip rail anchor. Represented by H. C. Elfborg.

American Guard Rail Fastener Company, Philadelphia, Pa.—Vaughan guard rail clamp. Represented by David L. Vaughan.

American Hoist & Derrick Company, St. Paul, Minn.—Transparency and photographs illustrating American railroad ditcher. Represented by Edward Coleman and C. C. Austin.

American Steel & Wire Company, Chicago.—Steel fencing, posts and gates. Represented by L. P. Shanahan, C. J. Boon, J. F. Alexander and J. W. Collins.

American Valve & Meter Company, The, Cincinnati, Ohio.—Anderson interlocking switch stand and safety switch lock, quick repair and economy switch stands. Represented by F. C. Anderson and J. T. McGarry.

Buda Company, The, Chicago.—Motor cars, switch stands, grinders, jacks and drills. Represented by G. J. Slibeck and Emil Johnson.

Carnegie Steel Company, Pittsburgh, Pa.—M-28 insulated and non-insulated steel ties, various sections of Duquesne bars and Braddock insulated rail joints. Represented by Robert Coe.

Commercial Acetylene Railway Light & Signal Company, New York City.—Acetylene flash light signal lighting and acetylene signal lighting. Represented by H. G. Doran.

Creepcheck Company, The, New York City.—Dinklage Creepcheck rail anchor. Represented by O. Metcalf, John R. C. Long and M. S. Schmalholz.

Crerar, Adams & Co., Chicago.—Calumet track drill, Eureka bonding drill, carbic light, Mac-it set screws, enameled signs, jacks. Represented by Russell Wallace, W. J. Clock, J. A. Martin and G. D. Bassett.

Daniels Safety Device Company, Chicago.—Bull dog nut. Represented by C. W. Rhoades and B. E. Dettman.

Duff Manufacturing Company, The, Pittsburgh, Pa.—Jacks. Represented by C. W. Thulin and G. A. Edgin.

Fairbanks, Morse & Co., Chicago.—Kerosene and gasoline motor cars. Represented by E. M. Fisher, L. H. Matthews, E. C. Golladay, F. M. Condit and A. A. Taylor.

Fairmont Machine Company, Fairmont, Minn.—Fairmont engines. Represented by F. E. Wade and H. E. Wade.

Frictionless Rail, Boston, Mass.—Frictionless rail. Represented by T. F. Dwyer, Jr., and Geo. H. Bryant.

Gosso Company, The, Chicago.—The Gosso bed. Represented by A. E. Gosso and T. J. Burke.

Hatfield Rail Joint Company, New York City.—Hatfield rail joint. Represented by T. B. Bowman and C. P. Williams.

Hayes Track Appliance Company, Richmond, Ind.—Hayes derails. Represented by S. W. Hayes, E. L. Ruby and E. W. Brown.

Heller Forge Works, East St. Louis, Ill.—Holdfast guard rail connector, R. S. A. switch stand. Represented by C. T. Coates and W. J. Webb.

Hubbard & Co., Pittsburgh, Pa.—Track tools. Represented by Edward Youngquist.

Indianapolis Switch & Frog Company, Springfield, Ohio.—The Eymon continuous crossing. Represented by E. C. Price, James H. Eymon and W. E. Harkness.

Kelly-Derby Company, Chicago.—Combination rail brace and tie plate, rail laying machine. Represented by C. W. Kelly and W. B. Holcomb.

Keystone Grinder Manufacturing Company, Pittsburgh, Pa.—Keystone tool grinders and attachments. Represented by H. C. Holloway.

Lackawanna Steel Company, Buffalo, N. Y.—Lackawanna hook shoulder tie plate, Abbott rail joint plate, spikes and bolts. Represented by C. H. Hobbs, F. E. Abbott and A. H. Weston.

Madden Company, The, Chicago.—Three-man track layer, Brown rail loader. Represented by T. D. Crowley and H. C. Holloway.

Morden Frog & Crossing Works, Chicago.—Guard rail clamps, rail braces, compromise joints. Represented by Arthur C. Smith, W. J. Morton and W. H. Hartz.

Mudge & Co., Chicago.—Motor cars. Represented by B. W. Mudge, R. D. Sinclair and George W. Bender.

National Lock Washer Company, The, Chicago.—Hi-power nut locks. Represented by John B. Seymour, Jesse Hough and John T. Patterson.

National Malleable Castings Company, The, Cleveland, Ohio.—Rail braces, tie plates, wrecking hooks and washers. Represented by J. J. Byers.

Northwestern Motor Company, Eau Claire, Wis.—Casey Jones engines. Represented by R. R. Rosholt and F. W. Anderson.

P. & M. Company, The, Chicago.—P. & M. rail anchors. Represented by P. W. Moore, F. A. Preston, A. R. Sutter, W. W. Glosser, S. M. Clancey, George E. Johnson and R. Harris.

Pennsylvania Steel Company, The, Steelton, Pa.—New Century switch stands, steel and positive switch stands, Never-Turn bolts, Mayari shovels. Represented by W. H. Allen and Stanley H. Smith.

Pittsburgh Steel Company, Pittsburgh, Pa.—Wire fencing, nails, staples and barbed wire. Represented by W. Sidney Lewis and H. C. Woodside.

Pocket List of Railroad Officials.—Copies of publication. Represented by J. Alexander Brown and Charles L. Dinsmore.

Positive Rail Anchor Company, Louisville, Ky.—Positive rail anchors, Betts anti-creeper tie plate, Economy switch points. Represented by W. M. Mitchell, W. E. Marbel, J. A. Shoulty, John C. Haswell and Charles J. Webb.

Prince-Groff Company, The, New York City.—Wedglock track drills, Kwik-grip wrenches, Pressurlokd water gage systems. Represented by Sherman W. Prince and C. B. Groff.

Q & C Company, The, New York City.—Vaughan rail anchor, Bonzano rail joint, O'Brien insulated joint, Q & C special guard rail clamp. Represented by J. V. Westcott, E. M. Smith, A. R. Horn and A. E. Stokes.

Rail Joint Company, The, New York City.—Weber, Continuous, Walhaupter and 100 per cent rail joints, reinforced angle bars. Represented by E. A. Condit, D. C. Isbester, R. W. Smith, W. C. Boyce, Chas. Jenkinson, C. B. Griffin, G. T. Willard and G. H. Larson.

Railroad Supply Company, The, Chicago.—Tie plates and derailers. Represented by A. H. Smith and H. G. Van Nostrand.

Railway Age Gazette.—Copies of publication. Represented by E. T. Howson, H. H. Simmons, K. L. Van Auken and Walter M. Ford.

Railway List Company.—Copies of publication. Represented by William E. Magraw, W. A. D. Short and Dalton Risley.

Ramapo Iron Works, Hillburn, N. Y.—Solid rolled double shouldered switch slide plate, manganese switch points, automatic switch stands. Represented by W. C. Kidd, Thos. E. Akers, A. Germunder, Denby Germunder and E. P. Bigelow.

Reading Specialties Company, Reading, Pa.—Rail straightener, reversible rail bender, guard rail clamps, rail joints, compromise step joint, trolley car rerailer, car replacers. Represented by B. J. Buell, F. G. Dunbar and George W. Sargent.

Sellers Manufacturing Company, Chicago.—Tie plates. Represented by R. A. Van Houten, G. M. Hogan and T. F. Geraghty.

Southern Railway Supply Company, St. Louis, Mo.—Saunders car stopper, Whitman & Barnes tools. Represented by Dick Achuff.

Spencer Otis Company, Chicago.—Tiger steel bunks, absolute lock nuts, Economy tie plates. Represented by T. W. Blatchford, H. H. Hart and W. L. Doremer.

Suggitt, J., Minneapolis, Minn.—Reversible side guard plow. Represented by J. Suggitt.

Templeton, Kenly & Co., Ltd., Chicago.—Simplex jacks. Represented by A. E. Barron, W. B. Templeton and Arthur Lewis.

Union Switch & Signal Company, Swissvale, Pa.—Keystone insulated rail joints. Represented by J. J. Cozzens.

Verona Tool Works, Pittsburgh, Pa.—Track tools, nut locks, levels, gages and jacks. Represented by H. Fisher, E. Wooding and Howard C. Mull.

Wharton, Wm., Jr., & Co., Inc., Philadelphia, Pa.—O'Brien insulated switch rod, guard rail clamps, switch stands, car placers. Represented by Thos. O'Brien and George R. Lyman.

ABSTRACT OF ENGINEERING ARTICLES

The following articles of special interest to engineers and maintenance of way men, and to which readers of this section may wish to refer, have appeared in the *Railway Age Gazette* since August 21, 1914:

The Present Status of Clearance Legislation.—A discussion of existing conditions as to side and vertical clearances, a review of the legislation in force on this subject, and a study of the need for more legislation of this kind, was published in the issue of August 28, page 377. The article showed that only 1.4 per cent of all deaths and only 3.2 per cent of fatalities to employees resulted from limited clearances and that accidents of this kind have decreased 33 per cent in the past five years.

New Shop Building Construction on Sunset Central Lines.—The construction of several shop buildings by the Sunset Central Lines at Houston, Tex., entirely of reinforced concrete and including 65-ft. roof girder spans, which are thought to be the longest ever attempted in shop building work, was described in an illustrated article in the issue of August 28, page 394.

The Re-arrangement of the M. K. & T. Freight House, St. Louis.—A description of the changes which have been made since the use of the telpher system was discontinued in order to fit the house for operation by the drop truck system on two levels, was described and illustrated in the issue of September 4, page 433. An editorial comment calling attention to the value of the experiment on mechanical apparatus for handling freight at this point, was published in the same issue, page 417.

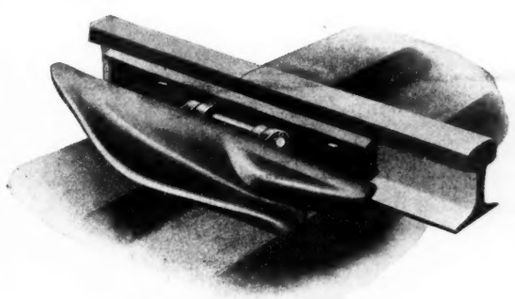
Pennsylvania Improvements in Cleveland.—The structures and methods used in elevating about 2¼ miles of the Pennsylvania's line in a densely settled portion of Cleveland and the construction of a new freight station and improvements to the Euclid avenue passenger station, were described in the issue of September 4, page 438.

Division of Maintenance of Way Expenses Between Passenger and Freight Traffic.—The difficulty of dividing maintenance of way expenses as tentatively outlined by the Interstate Commerce Commission and some of the units that might be taken as a basis for such a division were discussed editorially in the issue of September 11, page 458.

The Erection Equipment for the Quebec Bridge.—A description of the method adopted for the erection of the new Quebec bridge with its 1,800-ft. span and the details of the unusual traveler which was built for this purpose, was published in the issue of September 11, page 463.

THE SUPERIOR DERAILER

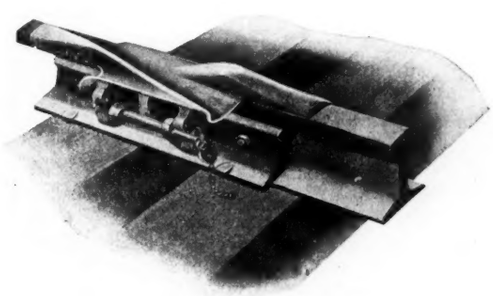
The Superior derailer consists essentially of a main casting and two eyebolts, one of which has an enlarged head to permit a locking pin to pass through it, to which a padlock may be fastened. This derailer is designed for either hand throwing, or for connection with an interlocking tower. To apply this derail, it is only necessary to remove the two center bolts of any rail joint, and to substitute therefor the two eyebolts furnished



Derailer in an Open Position

with the derail. A shaft is inserted through these eyebolts on which the main casting hinges. Thus the device can be applied readily in a very few minutes' time.

In one of the accompanying illustrations the derailer is shown open, in which position it clears standard snow flangers and low hanging equipment, while it does not permit the packing of snow. The other illustration shows the derailer in position for



Derailer in Position for Service

service, from which it can be seen that it permits of cars trailing backwards over it without derailing the car, while it is stated that tests have shown that it would derail empty freight cars moving forward at a speed of 30 miles per hour. This derailer may be attached to any standard interlocking switch stand, ground target, or other device that the signal or maintenance department may require. It is manufactured and sold by the Track Specialties Company, New York.

Rebuilding a Pontoon Bridge on the St. Paul

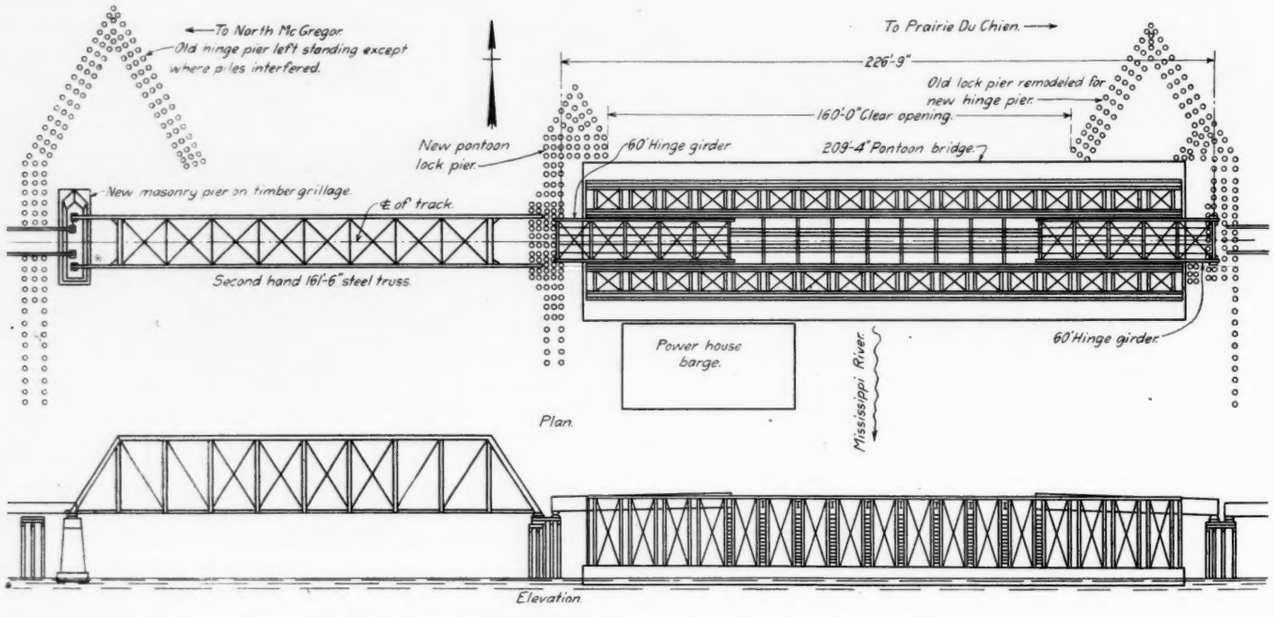
This Road Has Recently Completed a 209-ft. Span of This Unusual Type at Prairie du Chien, Wis.

One of the few roads on which the timber pontoon bridge is still used is the Chicago, Milwaukee & St. Paul, where four are in service—two crossing the east and west channels of the Mississippi river between Prairie du Chien, Wis., and North McGregor, Iowa, one crossing the Mississippi river at Wabasha, Minn., and one on the Missouri river at Chamberlain, N. Dak. The one over the east channel of the Mississippi river at Prairie du Chien, Wis., has been entirely renewed during the past year and was swung into place on August 2, while it is expected that work will be undertaken in the near future on the reconstruction of the pontoon across the west, or North McGregor channel. The deterioration of the old structure and the increasing weight of motive power made this work necessary. The new structure is designed for Cooper's E-50 loading, and in addition to allowing the operation of heavier motive power, it is an interesting example of modern design in this unusual form of construction.

Pontoon bridges have been used at this point ever since the line was first opened for operation over 60 years ago. When it became necessary to renew the structure at this time it was decided to rebuild it in kind, principally because of the heavy expenditure which would be involved in the construction of a steel bridge and in the raise in grade which would be required with the construction of a permanent structure since the extreme high water level is at practically the elevation of the present base of rail.

The present structure consists of a pontoon span across each channel with a pile trestle on an island between them and at each end. To offset the smaller first cost, this type of structure possesses several disadvantages. In the first place the maintenance cost of a timber structure is high, the life of the untreated timber pontoons previously used being only about 15 years. With the treated timber employed in the new structure a considerably longer life is expected. The cost of operation is also high. On the old pontoon two men were required day and night, while in the winter it was necessary to keep the ice cut away from the hull to prevent it being damaged. Also in the spring when the ice is moving and at times of extreme high water, it becomes necessary to swing the pontoon open for periods ranging from a few hours to two or three days at a time, requiring all traffic to be diverted via La Crosse, Wis., 60 miles north, or Savanna, Ill., 100 miles south. With the network of lines in this vicinity, however, much of the traffic normally crossing the river at this point can be diverted with little increase in mileage.

Preliminary to the renewal of this pontoon, permission was secured from the United States government to reduce the length of the span from 396 ft. to 209 ft. since the rafts which formerly comprised the main traffic through the east channel have now disappeared and the movements consist mainly of launches and small steam boats, the larger passenger boats using the west channel. As a part of the reconstruction a 160-ft. through truss was added to span the interval between the west piers of the new and old pontoons, enabling small boats to pass under this span at ordinary stages of the water without swinging the pontoon.



Plan and Elevation of Pontoon Bridge at Prairie du Chien, Wis.

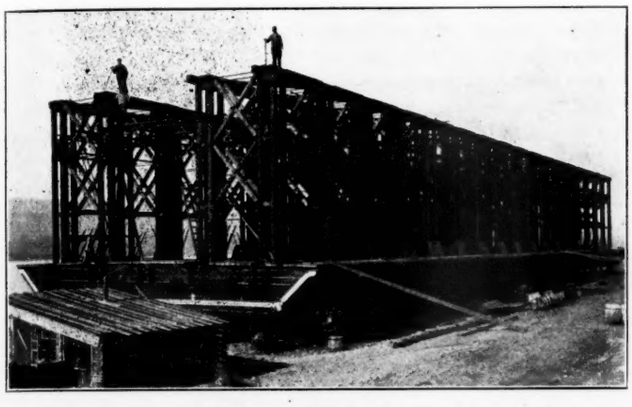
The hull of the new pontoon is 209 ft. 4 in. long, 55 ft. wide and 6 ft. 3 in. deep from the bottom of the sheathing to the top of the deck at the center. It is built of creosoted material and is sheathed with 4-in. planks. As far as possible all material was framed before treatment and wherever cut or bored in the field, the exposed surfaces were painted with Carbolineum. The deck is also of 4-in. planking and is provided with three inspection and eight ventilating hatches, each 20 in. by 30 in. in size. The hull is braced laterally by 2-in. rods extending from the bottom to the deck, while it is divided longitudinally into six compartments by five bulkheads constructed of 8-in. timber.

The track structure is carried on 10 steel floor-beams spaced 12 ft. center to center and a 60-ft. steel approach girder span at each end. These floor beams are supported on blocks and are moved vertically between four guide posts at each end to maintain the tracks at a uniform elevation with varying stages of the river. These guide posts form the vertical posts of two of the four longitudinal trusses extending the full length of the pontoon. These trusses are spaced 9 ft. 2 in. and 19 ft. 2 in., respectively, from the center line of the barge and are designed to give it stability. The vertical members of these trusses con-

sist of four posts spaced 2 ft. between centers and connected by 2-in. inclined truss rods. The two trusses on each side of the center are also connected by inclined timber cross bracing and 1¼-in. diameter horizontal truss rods.

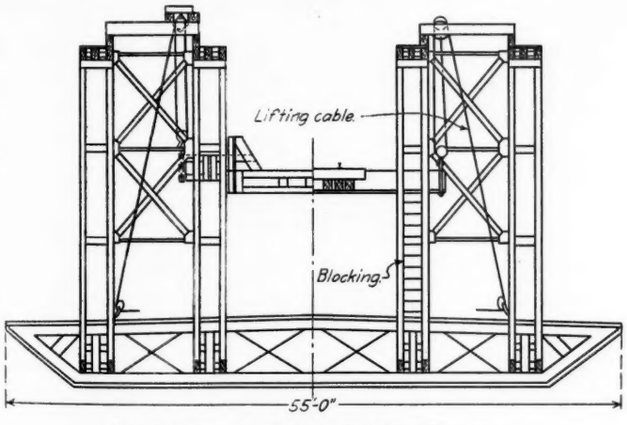
The floor beams rest directly on the blocking in the center group of posts. The amount of blocking inserted depends upon the stage of water, a maximum variation of 18 ft. being permitted in these guides. As the greatest known variation between high and low water elevation is 22.5 ft., extreme high water conditions, which are encountered only at considerable intervals, are met by raising the tracks on the approach trestles at each end.

The floor beams are provided with hooks at each end to which



The Pontoon Nearing Completion Previous to Launching

are attached cables running over sheaves in the tops of the guide posts and then to a drum in the machinery boat. When it is necessary to raise or lower the track the floor beams are raised one at a time and blocking is inserted or removed as desired. The minimum depth of block used is 7 in., minor variations in water level being taken care of by the approach girders. About one hour is required to raise or lower the track. The approach girders are supported on ordinary steel shoes and nests of rollers resting on pile abutments at each end of the bridge and on cross girders carried on blocking on the pontoon.



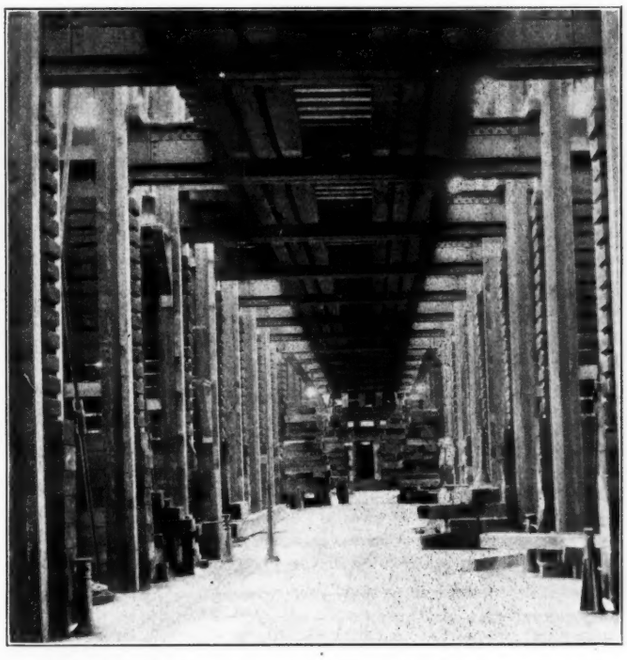
Cross Section of Prairie du Chien Pontoon

These cross girders are raised and lowered in the same manner as the floor beams. The track is given a camber of 8 in. when the pontoon is unloaded. Three stringers are provided under each rail with the ties resting directly on the stringers. Miter joints are inserted in the rails at each end of the pontoon, and they are raised before the bridge is swung.

The new pontoon is hinged at the east end. Its movement is controlled by a chain anchored to a pile buried in the bed of the river 100 ft. north of the fender piling at the free end of the bridge and also to a second pile cluster near the location of the swinging end of the pontoon in its open position. This movement is regulated by passing this chain over a sprocket wheel in the machinery boat, which is attached to the free end of the pontoon and swings with it. Under normal conditions the current is sufficient to swing the span open, while it is pulled back to its closed position by the engine on the machinery boat. Each end of the pontoon is protected by a pile fender, leaving a clear channel of 160 ft. Between 3 and 4 min. are required to open and close the span.

An average of about 10 trains cross this bridge daily. Flags are set in each direction before the bridge is opened, while all trains are required to stop and wait for a hand signal from the attendant before coming onto the pontoon. The maximum speed of trains is set at 10 miles an hour.

The hull was launched on May 22, 1914, after which the superstructure and lifting apparatus were applied. As stated above, it was floated into position on August 2. To reduce the inter-



View From Deck of Pontoon Looking Up Under the Track

ference with the operated lines to a minimum while placing the new pontoon in position, a detour trestle was built 38 ft. downstream from the permanent location and the old pontoon was floated to this offset line in January, 1913. Traffic was then directed to this line while the new pile abutment for the girder span and the concrete abutment at the west end of the steel spars were built. Permission was secured from the government to close this channel for four days while placing the new pontoon. It was started from its location on the bank ¼ mile above the bridge at 5 a. m., and the first train was run over at 4 o'clock in the afternoon of the same day. Shortly after the pontoon was connected up so that it could be opened for river traffic.

This structure was designed and built under the direction of C. F. Loweth, chief engineer, and J. H. Prior, formerly engineer of design. It was built and floated into position by company forces under the direction of Chas. Lapham, district engineer, and A. A. Wolf, district carpenter.

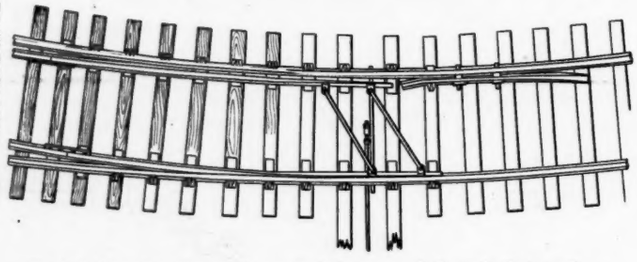
SOUTH AMERICAN RAILWAY CONSTRUCTION COMPANY'S LINES IN BRAZIL.—A total of 471 miles of railway controlled by the South American Railway Construction Company is now in operation in Brazil. The company is building 29 miles on the line from Fortaleza to Macapa, three miles on the branch from Ico, 31 miles from Fortaleza to Itapipoca, 21 miles on the line from Camocim to Therezina, and 12 miles from Amaracao to Campo Naior, a total of 96 miles now under construction. In addition the company plans to build 709 miles of approved proposed line.

STAGGERED SWITCH POINTS FOR SPECIAL SERVICE

By W. F. Rench
Supervisor, Pennsylvania Railroad, Perryville, Md.

Considerable economy is effected in the wear of switch points in yards at points where the service is extreme by moving the point of lesser wear back a distance of 26 in., so that the first lug of the one point and the second lug of the other are opposite, and introducing a guard rail 9 or 10 ft. long curved sharply through 12 in. at the end which covers the switch and in the standard manner at the other end. The guard rail is set close to the one point which permits 12 in. of 2 in. flangeway opposite the longer point. This greatly increases the life of the point and is an excellent protection against derailment as well. One set of lugs must be connected with the standard head rod and for entire safety each lug should be connected with the one diagonally opposite. If made on a standard plan these rods may be of regulation design, but if resort must be had to makeshift designs a flat made rod of 2½ in. by ½ in. material is quite satisfactory. Care should be taken that the guard rail, which is subject to a severe strain, is braced by anchor clamps and at least one tie plate guard rail fastener.

This arrangement has been used in a number of places



Sketch Showing Arrangement of Staggered Switch Points On a Curve of Heavy Wear

where the wear is severe, but perhaps in none where the conditions are as extreme as at two switches in the Midvale Branch, a siding leading to the Pennsylvania's Nicetown (Philadelphia) freight station, and to the plant of the Midvale Steel Company. These two switches follow each other closely and spring from the inside of a 17-deg. curve. Approximately 30 movements are made over these switches every day.

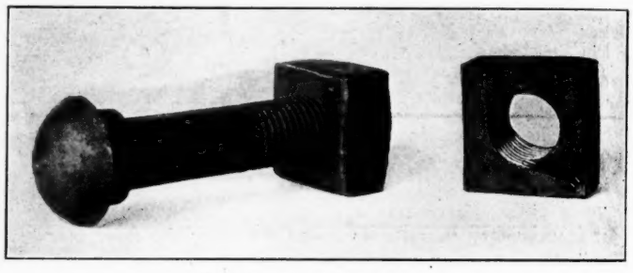
At each one of the switches the high side point, applied new of P. R. R. 100-lb. material, formerly lasted just two months, it being a matter of actual knowledge that 12 switch points were consumed in the two places within a period of one year. Besides, it was the rule for a derailment to herald the time for renewal which by reason of the difficulties of access to this location usually involved an expense for the wrecking and repair of equipment equal to the value of a new point. It is three years since the points now in track, which were then close to the limit of safe wear, were cut back and the guard rails applied and it is quite probable the points will still last two years longer. At this one location 60 switch points will have been saved in a period of five years, which represents at least $1,200 in money. As derailments have ceased there is the further saving along that line. It is doubtful if any single device or method in switch work is capable of effecting one-tenth the saving in expense of maintenance as the one herein described and illustrated in detail in the accompanying cut.

Safety First for Railroad Crossings.—At a certain particularly dangerous crossing on the Central Vermont the following significant sign has been erected: "Danger! This railroad crossing is a well designed death trap and is a disgrace to the state of Connecticut."

A NEW LOCK NUT

The "bulldog" lock nut has recently been placed on the market by the Daniels Safety Device Company, Chicago, and a number of railroads have given the new nut a thorough test. The design of this lock nut eliminates washers and separate nuts, the locking feature being secured by the insertion of a small piece of tempered steel into the face of an ordinary nut, as shown in the accompanying photograph. This pawl is set at such an angle that it will slide freely over the bolt threads when the nut is turned on, but when an attempt is made to reverse the nut the sharp edge of the pawl immediately cuts into the threads and effectually locks the nut against loosening. A variation of 1/32 in. in the diameter of the bolt thread does not interfere with this action of the nut. In case of the wearing away of the surface or of the stretching of the bolt the nut can be turned on further and will lock itself in the new position as effectively as when first applied, and it is claimed that in locations where the bolt is subject to vibration the lock nut will tend to tighten itself. The nut can also be made with the pawl on the outside or on the crown in order to make it possible to unlock it with a nail or wedge.

The principal advantages claimed for the new nut are that it saves in the length of bolt as compared with devices using two



The "Bulldog" Lock Nut

nuts, a cotter pin or washer, in the cost and the labor and inconvenience of applying such extra devices. It is impossible to put the bolt on the wrong way, as the locking pawl prevents its being turned in the wrong direction. When once started onto the bolt the "bulldog" nut cannot be removed after two threads of the bolt have been engaged.

The Chicago, Milwaukee & St. Paul put 26 of these nuts on bolts in frogs and joints in its Western avenue coach yard, Chicago, in December, 1913, which up to the present time have given very satisfactory service. The Chicago & Western Indiana equipped a crossing at Burnside, Ill., with the new nuts in March, 1914. It has been necessary to tighten these nuts once on account of the expansion of the bolts, but since the application of the new nuts no bolts have been broken, which is attributed to the fact that the nuts keep all of the bolts uniformly tight, making each take its share of the strain. Other roads that have test installations of the new bolts include the Elgin, Joliet & Eastern, the Chicago Great Western, the Chicago & Eastern Illinois and the Illinois Central.

An English Railway Storekeepers' Association.—A railway stores superintendents' association has recently been formed representing practically the whole of the railways of Great Britain and Ireland. The objects of the association are defined as follows: The promotion of the interests of railway companies in matters connected with the purchase and storage of material by (a) confidential interchange of information concerning markets, conditions of purchase, etc.; (b) the reading and discussion of papers on matters connected with the purchase, manufacture, sale, storage and distribution of material.

New Railway in Morocco.—The Spanish government has entered into a contract to build a railway from Tangier to Fez, Morocco.

The Handling of New and Scrap Maintenance Materials

The Second Series of Papers Discussing This Important Problem from the Standpoint of the User

THE SYSTEMATIC USE OF MATERIAL

By J. P. Costello

Roadmaster, Atchison, Topeka & Santa Fe, Pueblo, Colo.

I consider the distribution of new material with intelligent discrimination the most important item in a discussion of the handling of track material—not the restriction of distribution. When material is needed it is usually needed at once. Delays are always expensive and to have made plans which cannot be carried out, due to lack of material, is expensive not only to the job in view, but to other work which is being done pending the receipt of the material required.

In nearly all discussions which I have heard or read relative to the unnecessary holding of materials, the division engineer, roadmaster, supervisor or foreman is the one to whom the lectures have been addressed. Are these people always to blame? On nearly every division of every railroad there is to be found some piece of good material not in use which is being held to take care of some emergency which the store department is not able to handle with celerity. I have always found it advantageous to have on hand one left hand and one right hand standard main track frog. This, I know, is contrary to established "best practice." However, by so doing I can usually take care of a broken frog in one-third the time required by the storehouse. I *do not* think that every roadmaster should hold two emergency frogs—I *do* think that the store department should be able to deliver a frog so expeditiously, in case of emergency, that there would be no necessity of the roadmaster having them on hand. Aside from the handicap of a necessarily small stock, I have found greater efficiency in the division storehouse than in the large centralized storehouse.

Another thing which encourages the collection of unused material is the requirement, on many roads, that foremen must make their requisitions a month in advance of the receipt of the material. This causes the foremen to try "to be sure to have enough stuff to work with." Since the conditions of track work are variable and the right kind of foremen are naturally interested in having sufficient material to make the work progress, it seems to be asking too much of the foremen to expect them to foresee needs so far in advance? Why not cut this time down to about a week? If the store department takes three weeks to fill a requisition, then it is guilty of holding material too. Requisitions for certain materials, of which tie plates have been a striking example, have been held up from month to month until an accumulation sufficient for a mill order has been received and then the material comes in a deluge and quite likely at a time of the year when, on account of the other work, it is impracticable to use it.

In maintenance work there are many jobs, the accomplishment of which can be set for a certain date. For instance, bolts should be tightened in the spring and fall. Tie plating of curves can be done in winter. Replanking of road crossings can be done in the spring and fall. A complete job of tightening will require many renewals. Repairs to road crossings will require many new planks. Likewise tie plating requires a lot of necessary material. If jobs of this kind were set for a certain time, then unusually heavy requisitions about this time should be expected and at other times the minimum amount of material for this work should be on hand. I believe if I were engineer of maintenance of way or the corresponding official of a railroad I would set a certain time in the spring and also in the fall when every bolt in the main track should be tightened. I would see that sufficient new bolts were furnished. I would further see that no special job encroached on the allotted time. After that time any foreman, other than a yard foreman, who had more than a hatful of bolts would be subject to discipline. Jobs which can be timed can be handled satisfactorily both from the labor and material standpoint.

A proper balance should be maintained between material ordered and the amount of help allowed to use that material. A man may order a lot of material with the best intentions in the world, but due to a reduction in force it may be impossible to apply that material. Managements of various railroads do not object so much to new material in use as they do to unused new material. If the wastefulness of unused new material is to be measured by the loss of income which the capitalized value of this material would produce, then in the force allowance due regard should be given to the supplying of sufficient help to utilize this material.

Section foremen should gather up daily all scrap that comes to hand easily, but should not go to extraordinary pains to get it all unless the work being done is of such a nature that the scrap might be lost. A systematic "clean up" should be made about four times a year and the resulting scrap should be loaded. Foremen should be furnished full instructions as to the sorting of old material, so that various kinds can be loaded in separate cars eliminating further sorting. If a sorting or reclamation yard is maintained and all "pick up" material is sent there, it will be more economical to simply load all the stuff indiscriminately on cars and depend on the reclamation yards for sorting.

Much second-hand material is as good as new and such reclaimed articles should by all means be used. However, when a piece of material is used, it is certainly the intention to improve conditions, and the use of certain pieces of second-hand material is not consistent with the improvement desired or in keeping with the other material being used on the job. Considering the desired improvement, the cost of application, and the longer life of new material, the scrap value of the second-hand material would offset the saving of using it in preference to the new. I once worked for a railroad that was so parsimonious in furnishing spikes that about 90 per cent of the spikes in the track were "cutthroats." This is not economy.

Repairs to tools and material is an item of great importance. To be able to secure tools, which, though second-hand, are in good shape for use is a satisfaction and a pleasure. A road which takes proper care of its tools, equipment and materials not only saves money directly but also develops a good spirit among the workmen. Tools should be repaired properly and when the repairing is done on a large scale the quality of the work should receive more consideration than the amount of the output. Where a divisional repair shop is maintained each foreman should receive the same tools which he sent in for repairs. Of course where a large centralized plant is maintained this might not be practicable.

Credit should be given a division for tools or material sent to reclamation plants and this should be done with fairness so that there would be no necessity for making extensive checks and accounting of material, except at the plant. When a shipment is made figures should be furnished to the officers instrumental in the reclamation so that they would have the satisfaction of knowing the result of their efforts to save.

Measuring up scrap material merely to satisfy accounting purposes is useless and extravagant. When a rail is taken out of a side track because it is no good, it is scrap, and then the weight and not the lineal measurement is of interest. Definite but simple methods in the handling of scrap material should be adopted. It is unfortunate that railroads either have no definite methods of handling scrap and accounting for it or else the methods are so elaborate that they are not understood by all interested.

True economy in the handling of materials will depend more

upon the education of the foremen who have the direct handling than upon any other feature. This means the retaining of men in service long enough for them to learn the road's methods and to apply them.

The supervision of an engineer of maintenance of way or a general superintendent is necessarily superficial, hence the curtailing of requisitions by him must be to a certain extent arbitrary unless allowances are standardized. The adoption of a standard allowance of tools and materials for ordinary work is practical. The reason why it has failed has been not so much the fault of the foremen as the fault of the officers who should have allowed the tools. It is argued against the adoption of a standard list of tools that the size of the gang varies, hence, in order to have enough tools for a heavy section force we would have, at times, unused tools on hand. These unused tools comprise principally just picks and shovels, and picks and shovels are too cheap to interfere with a good system. I believe there are enough fair-minded roadmasters on any road to choose a standard allowance of tools.

Expeditious handling of requisitions, prompt deliveries of supplies, good repair work handled promptly, consideration as to the timeliness of certain work, education for foremen and others, standardization of tool allowances, figures showing in dollars and cents the extent of any reclamation project—these are things that will aid in the economic and satisfactory handling of materials.

A SYSTEM FOR THE DISTRIBUTION OF MATERIAL

By D. F. Stevens

Baltimore & Ohio, Baltimore, Md.

The reason men carry an oversupply of material is due primarily to the indiscriminate manner in which requisitions are "chopped." On one road this important item is turned over to a $25 clerk, unfamiliar with the road, the men or their various requisites. The usual procedure, when the operating head finds material is going up over last year's figures, is to get out a letter on the subject. This letter is repeated until every one is imbued with the idea of using just as little material as possible. The "ultimate consumer" then puts in a requisition for exactly the amount of material he can get through the month on. Every official from yardmaster or track supervisor up through all the various steps to the head of the department takes a whack at it, and when the material is eventually delivered to the man who ordered it, it reminds him of a 100 lb. piece of ice left out in the sun for hours in July, and next month he orders four times what he needs to allow for the cuts. A freight conductor once ordered two markers for his caboose and was surprised and amused to find that somewhere it had been cut to one. They might just as well have laid the main line with one rail instead of two.

The following system is based on divisional stores. The general storekeeper orders his material through the purchasing agent, who in turn has it shipped direct from the factory to the divisional stores and thus avoids extra handling. The individual requisitions are assembled in the division superintendent's office and, after being approved by him, are forwarded direct to the division storekeeper. On each division is a supply car which moves once a month over the division on the way freights. On the receipt of the requisitions the supply cars are loaded with each order and a triplicate blank filled out for each requisition. Before the trip is started all material in the cars are charged to the supply men, who go with the cars. The necessary empty scrap cars are carried with these loaded cars. An advance notice is sent out on the division outlining the movement of the cars. All scrap is located so it can be loaded where the good material is unloaded.

On arrival at a station, yard, section house, etc., the cars are met by the man receiving the supplies. At this point comes the secret of success of the plan. He is required to turn into the supply cars, scrap, second-hand or first class material for every piece of new material he receives, except in the case of waste, matches and other material of this nature. Only under this condition does he receive any material from the cars. Should a new tool be needed for which there is no old material to be turned in, the division officer directly responsible must personally sign the requisition and explain the necessity. When the cars arrive back at the stores, the man who accompanied the cars and distributed the material is obliged to check back an equal amount of scrap, second-hand or new material for every article he took out of the stores except in the case of matches, etc. The superintendent of the division assigns a trainmaster, chief despatcher, track supervisor or other officer to accompany the cars each month.

The success of this system is apparent. It teaches men to be economical with the material entrusted to their charge; it puts back into service first class material not applicable and second-hand material which is repaired and put back into stores; it collects scrap regularly to a common point which is sold and keeps the railroad from being cluttered up with a lot of material which takes up room, looks bad and goes to help swell the grand total of non-revenue producing investment. No cutting of requisitions is necessary here and an opoprtunity is afforded the division superintendent each month to check the supplies on his division. Old brooms eke out the last of their lives on engine decks or sweeping snow out of switches. Shovels are straightened up, track chisels are sharpened, lantern frames adjusted and all go back into service again, except the scrap. A 40 per cent saving can be effected in six months.

There are cases where the size of the division will not permit the supply of cars to be handled on the way freights and here a supply train is run, but the distribution is accomplished in half the time. When this system is installed for the first time it should be preceded by a general clean up of scrap. One year of this system cleaned up $380,000 worth of scrap material. This figure is net and not original cost.

LOCAL SUPERVISION IN THE DISTRIBUTION OF NEW MATERIAL AND THE COLLECTION OF SCRAP

By R. B. Abbott

Division Engineer, Philadelphia & Reading, Harrisburg, Pa.

For a number of years it has been the practice on our road to keep the emergency and maintenance supplies down to the lowest point consistent with safety and good judgment as to the probable requirements. As an aid to this plan, a monthly statement is prepared showing the material on hand as referred to an established basis of requirements determined jointly by the material and supplies department and the engineer maintenance of way. As this statement is itemized and worked up into money values, a very satisfactory check is afforded on the subsequent requisitions and it is very easy to see at a glance just where oversupply exists and how the excess can be distributed and interchanged.

Supplementary storehouses are located at each supervisor's headquarters and this prevents to a great extent the duplication and multiplication that would exist if the materials were shipped from the general storehouse direct to the foremen out along the line. Some extra handling is of course caused at the supervisor's storehouse, but this is many times offset by the saving in quantities.

The only materials sent direct to the foremen are oil and battery renewals. New rails and fittings are usually unloaded as soon after reecipt as possible and distributed direct from the cars to the point where renewals are to be made. This saves double handling of heavy material and permits a prompt release of the cars. A monthly report is submitted showing the mill rail and relaying rail on hand for sale or interchange and orders for shipment are usually given first place on the work train schedule.

Years ago the loading of miscellaneous scrap was dependent on the market price of such material and much delay in cleaning up was occasioned by long waiting for orders to load and ship. Our plan is now, however, to load once a month regardless of

market conditions and send the scrap to the general storehouse where it is picked over and properly arranged for disposition. Much waste is checked in this way as the reclaim is considerable.

The assembling and loading of scrap is too often neglected, as it is work that does not appear important to the section foremen and they are usually so busy at other things that the collection of scrap will be put off as long as possible. Hard and fast rules covering this can hardly be carried out, but the supervisor and division engineer should make it their business to see that a general plan is outlined and followed as rigidly as conditions permit, so that the tracks and right of way can be kept as clean as possible all the time and the money value of the scrap promptly recovered.

Section foremen should assemble the scrap at junction points of branch lines, near the entrance to yards and also at their headquarters. The points should be as few as possible to save delay to the worktrain, and each foreman should send a statement to the supervisor showing where the piles are located. On minor branch lines it is often possible to load the scrap without the assistance of a worktrain. This can be accomplished by starting a car at one end of the line and moving it along by local freight, setting it off at each section foreman's headquarters and forwarding it along in turn as the scrap is loaded.

The method to be followed is variable and must be selected to suit the different conditions, but I think it will be generally conceded that the greatest difficulty lies in the fact that section foremen do not appreciate the importance of gathering their scrap and must be stirred up occasionally. This is where the supervisor enters into the scheme and the results obtained are in direct proportion to the degree of supervision maintained.

DISTRIBUTING, RECLAIMING AND COLLECTING BRIDGE MATERIAL

By F. L. Burrell

General Foreman, Bridges and Buildings, Chicago & North Western, Fremont, Neb.

Our plan is to make a careful inspection of all structures on the division, being accompanied by a representative of the engineer of maintenance, and, if possible, by the general bridge inspector or his representative. We recommend what is to be done and submit the results of our inspection to the proper department, where decision is made as to just what will be done the coming year. Schedules are written up in detail, showing what repairs, renewals or permanent work is to be done.

From these schedules we make up a bill of material required for the work shown. We then take an inventory of all the material on hand and check over the unfinished work for the current year, or period, making allowance, as emergency material, for at least one 15-span bridge. We then deduct the material required for the current and emergency work from our stock on hand and apply any surplus to the requisition for the work of the coming year.

Separate requisitions are made for the different classes of material. We ask that the piles be made in three deliveries, March 15, April 30 and May 15; also three deliveries for timbers, April 10, May 20 and July 15. Bolts and other iron should be on hand not later than May 1. Cast iron or concrete pipe for culverts, cement, crushed rock, sand and stone, for permanent work, depending upon the amount of work to be done, should be delivered not later than June 15.

As the material is received and unloaded in the yards it is checked and a daily report of all material is made at the close of the day to the office. We also receive a daily report of all material sent out. We do not send the material out until the gangs are ready for it. As the material is received, especially the piles, each piece is measured and marked as to length. Any piles that we can not use in bridges, on account of serious defects, are used for "stubbing."

Once a month an inventory is taken and checked against the in and out shipments. This method calls to our attention any surplus stock or scrap that can not be used in the work that we have to do. In spite of this care, we often have a surplus; sometimes from our own carelessness, at other times because the storekeeper will insist on sending us something "just as good," or duplicate orders.

It would, perhaps, be a good idea in making requisitions to bear in mind that a large amount of timber taken from a structure that is rebuilt can be used for other purposes as at stockyards, where no great weight is to be sustained, around scales or in similar places. About 60 per cent of timber from such bridges can be used as bulkheads; or, in very shallow openings for drains, under highway approaches at railroad crossings. About 20 per cent can be used for repairs to other bridges, and 15 per cent perhaps will have an inch or two of rot on the exposed face or under the ties and other bearings which can be trimmed off, allowing the balance of the timber to be cut into planks suitable for stockyard fences or light platforms. Five per cent will go to the wood pile, to be cut up for kindling fires in locomotives.

Short pile heads, say from 2 to 4 ft. long, or old piles removed from a renewed bridge, are used for platform supports. Sometimes they are used for stubbing piles in repairing bridges whose life has about expired; we also split and use them for fence posts. If the piles are good cedar and the fiber has not been too badly damaged in driving, they are used in making shingles. Washers and spools are used in renewing the structure. Old bolts with good threads are used for the same purpose. If the heads are broken off, we use them for drift bolts and dowels. We also cut them to shorter lengths for car repair and other work; old iron of every kind is scrapped for melting for castings, etc.

We gather this scrap from time to time by local trains if possible, and by worktrain, where locals can not be used. Before we pick up, we use all the material needed in making repairs to nearby bridges.

We attempt to eliminate obsolete material by paying close attention to our monthly check and sending such material that we may not be able to use to the shops. The clean up must be made once a month and include an inventory that will force a surplus of any material upon the attention of the official in charge.

COLLECTING MAINTENANCE SCRAP

By R. Huber

Roadmaster, Chicago, Burlington & Quincy, Brookfield, Mo.

Our system of loading and picking up scrap is as follows: All section foremen have instructions to keep scrap cleaned up on their sections at all times. Adjoining the section tool house is a bin for the assembling of all small scrap. All scrap found along the right of way is brought in at the end of each day on the car and put into this bin. Scrap rail is piled next to the bin. At the end of each month the local freight trains carry a stock car for the loading of small scrap and a flat car for the loading of scrap rail, frogs, etc. These cars are placed next to the caboose. On this day all section foremen pile the scrap near the depot, so that a couple of men —who have been left to clean up station grounds and put everything in order around the yards—can readily load this material, while the merchandise is handled at the station. This eliminates delay to the train and inconvenience to the station force. This system has proved successful, not only inasmuch as it adds no expense whatever to train service, but it requires only one day to pick up all scrap on the entire division. While trains are being made up at the division point the yard maintenance force look over the contents of this car to see if there is any material that could be used in repairs around the yards, and thus avoid ordering new material.

We use an air rail-loader for picking up our rail. Our rail is first examined and marked by the inspector in three grades, thus: I, II and III and O for scrap. We generally

have more of grade II, and this being the largest quantity, is picked up first.

It requires seven men to operate the rail-loader and aid in the loading of rail. One man handles the air and three men stay on the ground; one to handle the hook and one at each end of rail to steady it on the car. We have two men on the car, one to unfasten the hook and one to place the rail. The seventh man has general supervision of the work and gives the necessary signals, etc. We also have a car for the loading of scrap bolts and spikes, and usually employ two men in doing this work.

We have picked up as many as 700 rails in a day, but the average day's work is about 500 rails.

All the new material that is left over, such as tie plates, anglebars, bolts, etc., is loaded by one man on the rear end of the rail-loader. This keeps all new material cleaned up, thus avoiding the making of extra trips over the division to pick up such material.

When unloading new material, such as rail and fastenings, it is handled with the same worktrain. Rail is unloaded from flat cars and the car containing angle bars is unloaded by two men, who throw off one pair of anglebars with every rail. We also distribute bolts, spikes and nut locks at the same time, and when we have the rail distributed everything is in readiness for the rail laying gang to commence work.

DISTRIBUTION OF MAINTENANCE MATERIAL AND COLLECTION OF SCRAP

By J. W. Carey

Clerk to Supervisor, Pennsylvania Lines, Bellaire, Ohio.

To provide for the proper ordering and distribution of new material, I would suggest that a storeroom be established at some point on each division and the supervisors be given instructions from the office of the division engineer to furnish the storekeeper at a certain period of every month a complete list of the material that will probably be needed for the next 30 days.

The storekeeper can then compile all these statements to determine the amount of material to be kept in stock. This material can be ordered directly from the manufacturer and when received kept on hand for distribution to the section foremen.

Section foremen will order material as needed from the supervisor, who in turn will request the same from the division engineer, by furnishing the necessary order. The division engineer will then approve such order and forward to the storekeeper as authority to furnish the material to the section foreman. When received, the section foreman will unload where needed. The kinds of material coming under this heading are frogs, switches, guard rails, clamps, switch stands, bolts, nut locks, spikes, etc.

To properly care for such material as ties, rail, anglebars and tie plates, each section foreman should go over his respective section each year, accompanied by the supervisor, to ascertain the amount of material needed for the following year. Orders should then be made to have the material shipped directly to the supervisor. When received the supervisor will arrange to have his worktrain distribute the material where needed.

In the event of cross ties being received in the winter time, they should be unloaded in piles of 50, located as close as possible to the point where needed. If ties are received in the spring, however, they should be unloaded and scattered along the line where they are to be used, in order that the one handling will suffice.

As to the collection of scrap material, all heavy material such as frogs and switches accumulating from the track should be picked up and placed in piles by section foremen daily and all other heavy scrap placed in the same piles as soon as discovered along the track. To take care of light scrap material, each section consisting of three miles or less should be provided with a scrap box, located at the center of the section, while all sections consisting of four or more miles should be provided with two boxes, located about one mile from each end. As such material accumulates the section foreman should pick it up while running over the section on his hand car daily and place in the nearest or most convenient box.

The supervisor should make arrangements for a worktrain to go over his subdivision at least once a month for the purpose of picking up all scrap material, mill rail and old frogs and switches. The worktrain on such occasions should be provided with three cars, one to receive the mill rail, one for scrap frogs, switches, stands, etc., and the other for worthless scrap. When loaded, cars should be shipped to the storeroom and the storekeeper given a correct report of the amount and weight of the rail contained in the mill rail car, which will enable him to dispose of rail, without unloading, providing he has sale for it. All scrap frogs and switches and other scrap can be separated into bins at the storeroom while being unloaded and then disposed of by the storekeeper as rapidly as he can secure sale for it when the best price is prevailing.

The foregoing suggestions include some of the methods actually pursued on this subdivision.

DISTRIBUTION OF NEW MATERIAL AND DISPOSITION OF SCRAP

By A. M. Clough

Supervisor, New York Central & Hudson River, Batavia, N. Y.

My experience leads me to believe that the following methods of distributing maintenance of way department material will prove most satisfactory under present conditions. Rails, ties and switch timbers are furnished in accordance with the annual budget compiled in the office of the engineer of maintenance of way from estimates furnished by the various supervisors of track, after a careful inspection of their territory as to necessary track repairs and renewals for the coming year. The supervisor always advises the most advantageous point for this material to be shipped to prevent back haul or unnecessary handling.

New rail is unloaded as fast as received and set up between tracks at points where it is to be laid, the anglebars being handled in the same manner. The released rail is assigned to other tracks or subdivisions the same as the new rail and is loaded and shipped promptly when taken out of track.

When the ties are received late in the fall or during the winter they are unloaded into standard piles as near as possible to the points where the foremen will use them when they start the spring work. This refers more particularly to untreated ties, as our tie-treating plant does not usually start operations until about April 1, and when these ties are received they are distributed along the track on which the foreman is working, thus obviating the expense of more than one handling.

The annual allotment of switch timber is received during the fall and winter and is unloaded at headquarters, where it is sorted according to lengths and is sawed into sets to fit the various turnouts before being taken out on the road.

Frogs, switches, miscellaneous track material and tools are ordered monthly by the supervisor of track and are stored at headquarters, with the exception of a small amount of material, especially frogs and switches, at various points along the division for emergency use. Everything that can be should be placed under cover to prevent deterioration from weather and no more of any material should be ordered at one time than is needed as a supply for two months or the length of time required to get it from the manufacturer.

The section foreman should send in on the first day of each month a requisition to his supervisor for such track material, tools and supplies as he will need for the month. This is checked by the supervisor and given to the storekeeper to furnish. This is

shipped by local freight except in cases where it can be handled to better advantage and with more economy by a work train.

The foreman should keep an accurate record of all material on his section on blanks furnished him for that purpose which should show the material on hand at the beginning of the month, the amount received during the month, the amount used and the balance on hand at the end of the month, at which time it should be sent to the supervisor for his information and file and to enable his office intelligently to furnish foremen with material required and avoid any surplus material accumulating.

Each supervisor of track should prepare each month a statement showing a list in detail of all surplus and obsolete material he has on his division, these statements to be sent from one supervisor to another, thus enabling the various supervisors to see what is on hand at various points. If they can use any of the material they furnish shipping directions. If this method is followed up vigorously very little surplus material will remain inactive for any great length of time.

Scrap material should be handled in just as systematic a manner. The worktrain should make regular trips over the division to pick up all such material, loading separately each class of scrap, that is, car scrap in one car, miscellaneous track scrap in one, frog and switch material in another and rail in another, as this will save considerable sorting at headquarters.

All miscellaneous car and track scrap should be shipped in carload lots when possible to a scrap platform located at some central point where it is sorted as to iron and steel and wrought, cast, malleable, etc., after which it is advertised for sale by the purchasing agent, who keeps in close touch with the market value of this material and sells it when the price is right.

Regarding scrap steel rail, frogs and switches. This should be divided into three classes: First, straight rail free from frogs, switches and guard rails and over 5 ft. in length and weighing more than 50 lb. to the yard; second, all cropped rail ends under 5 ft. and over 50 lb. section; and, third, all sections of rail not coming under Classes 1 and 2, and including frogs, guard rails and switch points which are free from plates, fillers, etc. Rail is to be reported under these classes each month by the supervisor, who is furnished with a sale order later by the purchasing agent.

SUGGESTIONS FOR THE HANDLING OF MATERIAL

By Geo. E. Lowe

Supervisor, Delaware, Lackawanna & Western, Elmira, N. Y.

Making proper requisition for new material, preserving it in first class condition without loss or deterioration until used and assorting and reclaiming usable material from scrap amounts to a large saving to a railroad company. A large part of the gain in scrap is up to the maintenance of way department, as that department must gather all scattered scrap on the right of way. Therefore every man in the maintenance department should be instructed and drilled in the best method of handling scrap, which of course varies to some extent owing to the different conditions on the different roads, but the general principle of instruction can be the same.

Very good results have been accomplished by calling together as many of the division officers as possible. Going over the whole question of material and scrap, then spending one day on an inspection and observation tour over certain parts of the road and in the maintenance shop and scrap yard with the head officer of the maintenance department as pilot, will do more in the way of educating the men to the proper method of handling material and scrap than any number of circular letters could do, if not followed up with these meetings. These instructions should be passed along down the line to every man in turn and each division officer should call together as many men under his supervision as possible at different times and not only instruct them, but have them discuss between themselves the question of handling material and scrap.

There should be as few special requisitions as possible. All requisitions should cover the amount of material required until the following requisition is filled. This is very important, for to have to do unnecessary work, or have work held up on account of shortage of tools or material is equally as bad and expensive as to order and carry on hand too much.

A supply of material is usually kept on hand at the division headquarters. This should be well taken care of and a careful record and check kept of it. Each division officer whose duty it is to supply foremen under his supervision with tools and material should keep a record of the exact amount and date of tools and material received by each foreman from time to time. This will enable him to handle the foreman's requisition in such a manner as to prevent wastefulness, as by referring to his record at any time he can ascertain just which foreman is ordering more material or tools than is really required.

An inspection of all tool houses, tool cars and scrap yards should be made from time to time, and all excess tools and material should be collected and put into use where needed, or, if obsolete, scrapped. All material that is affected very readily by the weather should be kept under shelter. Metal material, including rails, frogs and switches, should be neatly piled, and either painted or oiled often enough to prevent rusting. This can be handled at a very small cost, if painting is done by the painters as they go over the division painting other right of way fixtures, and each foreman having a supply of material on hand is furnished with a barrel of oil and a sprinkling can or even a broom. The barrel of oil should be planted in the ground near the material yard, and should have a cover and lock. This will eliminate the necessity of keeping it in a car or tool house and lessen the danger of fire.

On the average section outside of yards the amount of material held in stock for repairs and emergency cases may be materially reduced by pairing the sections off in twos, then placing the rail posts or rail racks and supply material at the intersection of the two sections paired together. This will practically cut the amount of material of this kind down to one-half that necessary under the individual section plan.

The gathering and collection of reclaim and scrap material would be necessary from a safety standpoint, if from no other, as it is very dangerous to the traveling public to allow scrap to lie around where someone may fall over it, or some mischievous boy may place it on the rail, where it may cause a wreck. Also it is very dangerous to life and limb of employees, whose duty requires them to move around moving trains and cars, especially at night. A very good system to follow and one which has given excellent results is to have maintenance of way men from laborers up consider it part of their duty to remove every piece of scrap they may see at least 8 ft. from the nearest rail, wherever possible. One day of the week, preferably Saturday, should be set aside for cleaning up, gathering and sorting scrap, classifying it as much as possible, placing all small scrap in old kegs or boxes, so that it may be loaded by the worktrain gang without sorting and with as little delay as possible to the worktrain and traffic.

Each division should be cleaned of all scrap material at least once a month, it being the custom of most roads to hold scrap material until the market is good. This being the case, it should be neatly piled up along some siding where cars can be placed and unloading and loading done without the aid and expense of a worktrain.

On nearly all roads more or less good reclaim material will accumulate, especially metal fastenings, which on account of the increase of weight of load and weight of rolling stock necessitates the use of larger and heavier material. After being removed from track this should be sorted from scrap material, neatly piled up and preserved, and a list of such

material furnished the head of the maintenance of way department, who will order it shipped to minor divisions or points where it can be used, thereby saving the ordering of new material where this reclaim or second-hand material will answer as well.

ECONOMIES THROUGH LIMITING EMERGENCY STOCK AND THROUGH PROMPT DISPOSAL OF SCRAP

By W. F. RENCH

Supervisor, Pennsylvania Railroad, Perryville, Md.

The period of semi-depression through which the railroads have operated of late has brought with it new economies that will be of benefit for all time. Chief among these are the great reduction in the amount of surplus and inactive material and the more active assembling and disposal of scrap material. It used to be the opinion of operating officers that every important switch layout should be protected by duplicates of the frogs and by an ample number of surplus switches. A slip crossing was not protected unless there was a complete set of rails, frogs and switches and even plates and chairs. But now a half slip set is recognized as supplying ample material and a length of rail that could be used to continue main line movement, together with a single switch, is sufficient to cover an important interlocking. The ordering of material for new work a long time ahead of its prospective use is an item of extravagance that is now discontinued. A case is known of material for new work to the amount of $20,000 having been ordered and received two years in advance of its application. Fortunately the exigencies of the hard times uncovered the error before much was lost through interest accruing on this large investment in unproductive material. A closer scrutiny of requisitions and comparison with amounts on hand, a more exhaustive check of material one section lacks against the excess on another section and even the interchange of lists of material surplus on the different divisions of the road have resulted in a reduction in the surplus stock accounts—it is no idle guess—of fully one-half.

It is doubtful if the average operating officer appreciates what it means to his company in money to dispose promptly of the scrap that accrues constantly, both from the source of repairs and of damage to equipment in passage. It is no unusual circumstance to find in various secluded places at times when its loading is mandatory as many as 30 carloads of scrap on a single superintendent's division. This amount, if the material were all scrap, represents a value of perhaps $20,000, and if held three months longer than necessary involves a dead loss of $250, which, applied to a grand division, means $1,000, or to an entire system $5,000. But the material is not all scrap. When it reaches the storehouse and is sorted at least half is found to be usable and no small part entirely new material.

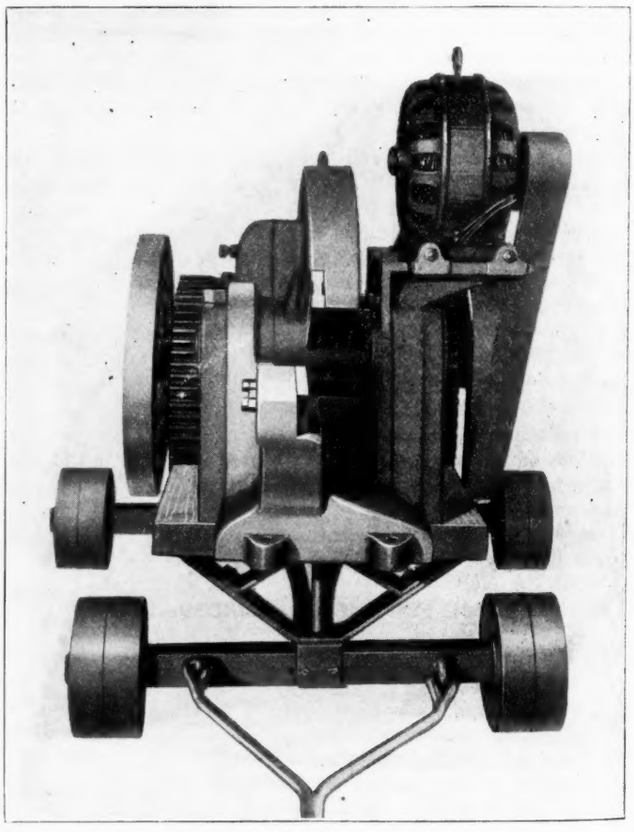
No system of scrap reclamation will furnish the desired results that is not automatic and routine. On many roads the rule is in force that Saturday, whether it be the entire working day or the short day, that is more common, is given over to policing and the general cleaning of the roadbed, which includes the collecting of small scrap. Every tool house is provided with a bin where this small stuff is stored, often until it overflows, but not infrequently the Saturday's collection lies in the center ditch awaiting a convenient time for trucking it to the section headquarters. If the supervisor were equipped to run a train over his division every Saturday afternoon this unsightly material might be disposed of at once, but the considerable time required for hand loading necessarily postpones the collection.

There is in use at some of our shops a type of locomotive crane with magnet, generator and switchboard which handles small scrap quickly and with a minimum of expense. Such a contrivance requires only the attendance of one man and the cost per ton of loading the scrap at the shop has been found to be as low as one cent. The cost would of course be very much greater loading it along the road, but with average opportunity to work would probably be no more than 6 cents per ton. Such a contrivance run special over the road, say every other Saturday, would result in a clean division for the holiday travel and would bring the scrap under the eye of the proper authority.

A PORTABLE MOTOR DRIVEN SHEAR

A motor driven alligator shear has been mounted on a truck by the Canton Foundry & Machine Company, Canton, Ohio, in order to make the shear easily portable and facilitate the cutting of scrap material in various parts of a yard or at different points along the line. The advantage to a railroad of cutting its scrap is evident when it is realized that much of the light scrap is sold to dealers at prices as low as $0.50 a ton, while the same dealers after cutting it, sell it for as high as $6 per ton.

These shears are made in two sizes, the No. 1 having a maximum capacity of 1½ in. square in soft machinery steel or iron



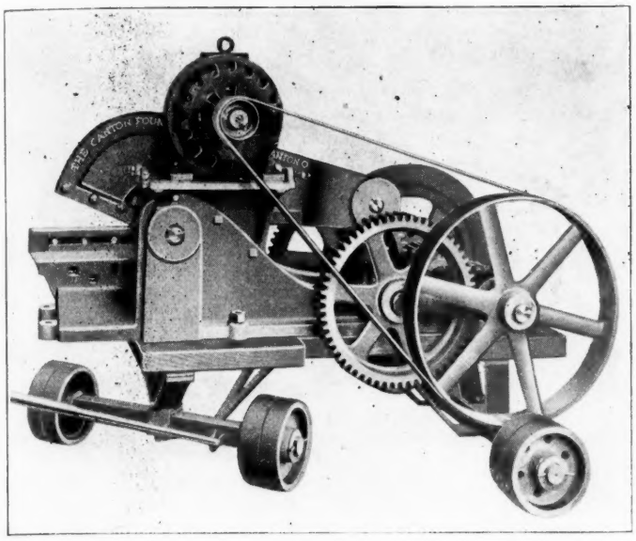
Portable Shear for Cutting Scrap

and making 50 cuts per minute. It has a 13-in. knife with a 6-in. opening at the widest point, weighs 4,200 lb. and requires 3 h. p. to operate it. The No. 2 size has a maximum capacity of 1¾ in. square, making 45 cuts per minute. It has an 18-in. knife, a 7½-in. opening at the widest point, weighs 8,000 lb. and requires 5 h. p. for its operation. Larger sizes could be mounted in the same way if desirable, although the larger shears are not as easily portable.

The trucks are substantially made, having wheels of good diameter and a 3 in. oak plank bed to which the shear is bolted. The front axle turns under to facilitate the turning and backing of the shear, while the tongue or pulling handle can be fastened to either the front or rear axle. This makes it possible to draw the shear up to a pile of scrap and after cutting it,

attach the tongue to the rear of the machine and pull it out backwards without turning or backing. The bed of the truck does not extend out to the front of the machine, so that in cutting scrap none of it can accumulate in and around the machine.

The shears are driven by a motor belt connected to the shear pulley. This method of driving has the advantage over direct gearing that in case of an accident which would overload the



A Motor Driven Alligator Shear Mounted on a Truck

machine either the gears or the motor must break if the connection is secured by direct gearing, while with the belt drive the belt can slip the fly wheel and no damage will be done. The Canton shears are double geared, making them smooth and easy running and prohibiting the breaking and twisting of the crank and countershafts. This is also said to decrease the amount of power required per square inch of cutting capacity.

PRACTICAL CONSIDERATIONS IN CURVE MAINTENANCE

By W. F. Rench

Supervisor, Pennsylvania Railroad, Perryville, Md.

The physical requirements of a curve having been amply met in perfect alinement and correct superelevation and the easement and run-off being in proper proportion and location, the supervisor is confronted with the task of maintaining the excellence of these features. It is well known that each is co-related to the others. Perfect line will not continue if the surface becomes deficient; the surface breaks down more quickly when the line is allowed to deteriorate, and the easement and the run-off suffer if one or the other develops defects.

The maintenance of good surface is more necessary on curves than on tangents. A ¼ in. variation in the level of a tangent, provided it is continuous, cannot be regarded as poor maintenance. Such a condition might exist for some time and its presence be undiscovered until a critical test was made with the level board. In ordinary practice no attempt would be made to level up a tangent track having no greater variation than this until a raise in face was being made, when, of course, the surface would be made true.

But on curves such a defect would be immediately objectionable. While superelevation is generally chosen to the nearest half inch, care is taken that any error is in excess rather than deficiency. Many main line curves are of light degree, 20 min. being most in favor. Experience has shown that at high speed ½ in. variation in superelevation makes the difference between satisfaction and discomfort. The difference is much more marked if the established superelevation of 1½ in. becomes as little as 1 in. in places through breaking down of the surface. Bad maintenance would soon be apparent, both in the line and the surface.

Uniform superelevation is the most important element in curve maintenance. This requirement can only be attained by consistent supervision. The track foreman is ordinarily quite faithful in his use of the track level when surfacing is being done, but he is not so apt to carry his level with him to try his curves for this defect. If the surface of the rail sights properly the track is in his view all right. A test under his eyes with the level is the best lesson that can be given. The line having been made correct, the maintenance of good surface is necessary to its continuance. But even with faithful maintenance there is a certain amount of slight shifting under the traffic which cannot be controlled and which requires periodical correction. If neglected these slight detail defects soon increase to the extent of a general deficiency and eventually the line of the curve is lost and another relining with the string is necessary. In no other feature of track work is the old saw regarding the stitch in time more aptly illustrated.

There is no permanent means of marking the correct line of a curve. Stakes are struck by dragging parts of cars and sometimes only slightly disturbed when they become worse than useless. Steel pins, old rails, even stone monuments are disturbed by frost and in any event their usefulness depends upon measurement with a varying tape line held in every position except the horizontal. Maintenance of the correct line by continued watchfulness is the better practice.

The correction of the short depressions often no more than two or three rail lengths in extent is an important item in curve maintenance. These dips are very unfavorable at any point, as they render fine lining impossible and, no matter how perfect the work with the level, their presence prevents fine results in surface. But they are particularly objectionable on curves. Doubtless in theory they cause no defect if symmetrical with the cross section. But the depressions in the two rails are seldom directly opposite and a rolling of the car is the inevitable result, which under extreme circumstances may become a lurch. They should be regarded as defects and carefully eradicated in the general surfacing program.

A raise in face is periodically necessary for all main tracks, the intervals depending upon the kind of roadbed and the character of the traffic. When such raising is being done on curves, it is customary for the low rail to be selected as the grade rail. But a very distinct advantage may be gained by using the opposite rail. In raising tangents it is very desirable to raise both rails together and usually against the current of traffic. But on curves many foremen prefer to raise the high rail to a proper grade, introducing for the time being added superelevation, and to follow this by bringing the low rail to the grade required for proper superelevation, and this procedure is usually the better one when the raise is moderate.

The basic requirement for curve maintenance is an ample renewal of the cross-ties to provide a firm bearing at all times. Generous tie replacement is desirable in all kinds of road, but it is essential on curves. This is not alone needed for maintaining the gage, although that is the prime consideration, but it is also necessary for conserving the surface, which in turn contributes to permanence of the line. A main line curve can hardly be considered adequate track for heavy service unless well tied and having each tie protected by a tie plate.

The importance of correct gage on curves cannot be overestimated. The superelevation of a curve is of course adjusted to just one speed. If the movement is at a very much slower speed the wheels will impinge upon the inside rail, if faster upon the outside rail. In either case a variation in the gage becomes immediately noticeable. The tendency of every curve to spread can only be met by a full equipment

of tie plates. These should be provided with a single rib across the axis of the tie, both on the top and on the bottom, the one to maintain the plate in its established place on the tie and the other to supply a bearing surface for the rail base. The tie plate should carry a third spike to draw the plate close against the rail base and to help hold it in place. When tie plates are being applied the gage should be made ⅛ in. tight, so that when the rib of the tie plate has settled into the tie the gage may be neat 4 ft. 8½ in. The gage should only be widened when the degree of the curve exceeds 10 deg. and should never be made more than 4 ft. 9 in. The best means of detecting imperfect gage by a casual inspection is to run the eye along both rails of the track. If an irregularity shows upon one rail and not upon the other the trouble is surely in the gage. Even where the track is plentifully equipped with tie plates there is constant need of gage correction and to this end it is the practice on many divisions to keep a gaging gang of three men constantly employed. If the leader of this gang is efficient the gage correction may be made a means of correcting the detail line as well.

The order of correction for the various defects of curves that are generally deficient should be: First, a roughing in of the line to render the test with the string more effectual; second, adjustment of the line after a careful study of the ordinates obtained; third, application of a proper superelevation, including the run-off, or correction of any deficiency that may be found in the existing superelevation; fourth, the regaging, which is readily apparent after the line rail has been made true, and, fifth, a fine detail lining.

The general correction of the line is nearly always the first operation, because if the throws should be several inches the fine surface would be disturbed and in the event that the established superelevation were excessive for the curve when made regular, this amount of elevation might be necessary even for safety at points on the curve where sharp places exist. Further, the proper superelevation and its limits and the approach and run-off can only be determined by the line study of the curve. A careful examination of the present run-off is quite essential, as it is no unusual occurrence to find the run-off improperly located, sometimes as much as several hundred feet from where it should be.

A very common defect which is of the tangents, but pertains to the curve adjustment, is the protruding of the ends of the curve outside the line of the tangents. This defect arises through the tendency of a curve to make its own easement and through the invariable practice of maintainers lining out the ends of curves to obtain the advantage of an easement. It is found when the curve is provided with proper easements in the relining, the natural shifting ceases and there is no longer a tendency of the foreman thus to distort the line in endeavoring to make a seeming correction. The elimination of this defect should be one of the main considerations in the preliminary lining, as its presence precludes a proper adjustment of the line.

When accurately adjusted and faithfully maintained curves are just as comfortable in riding as any other track. Although once the opposite of comfortable, the presence of curves is scarcely noted by the ordinary passenger and this result has been reached through the greater consideration that is now being given to curve maintenance.

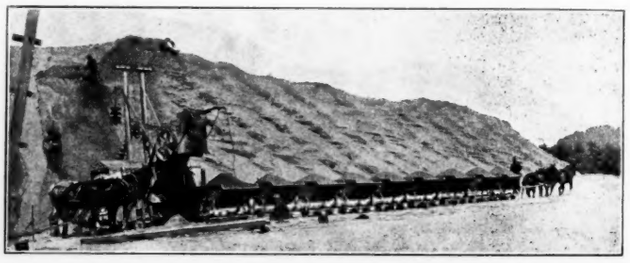
AEROPLANE ACCIDENTS.—The number of aeroplane accidents reported from various principal countries in the first six months of this year in which the pilots were naval or military flyers, and which had fatal results either to pilot or passenger, was as follows: Germany, seventeen; Russia, eight; Great Britain, seven; France, seven; Austria, three; United States, two; Italy, two; Turkey, two. The following was the number of fatal accidents in which the pilots were civilians: France, fifteen; Germany, four; Great Britain, four; United States, four; Russia, two; Italy, one.

AN INTERESTING USE OF PORTABLE TRACKS

An interesting use of portable tracks in construction work is illustrated in the filling of a large hollow at Golden Gate Park, San Francisco. Here one mile of 20 lb., 24 in. gage, portable track is laid, over which 75 steel dump cars of 36

Lifting Section of Portable Track off Street Car Rails

cu. ft. capacity are used to transport sand from a high bank to the hollow, the cars being loaded by specially designed excavators operated by gasoline and capable of loading 10 cars every 10 minutes. These cars are hauled down a city



Loading the Cars

street from the point of excavation to the fill, crossing one street car line, where a man is stationed who removes the section of portable track whenever a street car approaches, as shown in one of the illustrations. Both the cars and the track are of Orenstein-Arthur Koppel Company construction.

AN UNUSUAL ARTESIAN WELL FOR A WATER STATION

BY C. R. KNOWLES
General Foreman Waterworks, Illinois Central, Chicago.

Two things are essential to an artesian water supply. First, that the porous water bearing bed receive its supply at a point, or in a region where it lies comparatively high; and second, that it be enclosed by comparatively impervious beds. If the enclosing beds permit no water to escape and completely surround the reservoir, except in the region of supply, then when the reservoir is penetrated by a well the water will rise to the height of the lowest point of supply.

This condition is never fully realized. The so-called impervious beds are never absolutely water tight and but few water bearing beds are completely enclosed by impervious material. The head of artesian water is therefore somewhat lower than the source of supply and it may be very much lower. It is a common belief that the head of water increases with the depth of the well, or that flowing wells may be secured anywhere if wells are sunk to a sufficient depth, but experience has shown that the sinking of wells far below the principal water bearing strata has commonly resulted in highly mineralized waters rather than an increased head.

Flowing wells are by no means uncommon, particularly in

the southern states, but a well delivering water sufficient for over one hundred locomotives daily at 50 ft. elevation deserves special mention. Such a well supplies the new water station of the Illinois Central at Roseland, La., which eliminates the old steam plant at Tangipahoa. Roseland is located on the McComb district of the Louisiana division, 72 miles north of New Orleans. The location of a water station at this point provides a better spacing, and permits an increased tonnage over this district.

The qualifications for an ideal railway water station are, first, an abundance of good boiler water; second, proper location with reference to grade, curvature and spacing; third, low cost of pumping. The new station at Roseland embodies all of these qualifications, the distinctive feature being the flowing well which delivers water direct to the tank without cost for pumping.

This well is 6 in. in diameter and is drilled to a depth of 924 ft. It flows over 700 gal. per min. at the surface of the ground, and the flow through the overflow pipe after filling the tank 45 ft. above the surface is over 400 gal. per min., sufficient to supply 125 trains daily. The total static head of the well is 90 ft. The quality of the water is excellent both for drinking and for locomotive use. It contains less than ½ lb. of incrusting solids per 1,000 gal. The chemical analysis is as follows:

Iron, aluminum and silica oxides	.93 grains
Calcium carbonate	1.16 grains
Magnesium carbonate	.88 grains
Alkali chloride	.93 grains
Alkali sulphate	.70 grains
Alkali carbonate	.72 grains
Total solids	5.32 grains

The flow was encountered in white sand at a depth of 720 ft. This stratum of sand is 204 ft. thick with an overlying stratum of hard clay 122 ft. thick. There is also a stratum of clay beneath the flowing sand, the thickness of which was not determined. The well was drilled by company forces with a rotary well machine. This method of drilling consists of rotating down the casing under water pressure, the water washing out the sand and clay as the pipe is lowered.

In drilling in sand strata great difficulty is experienced from caving and loss of wash water through the sand unless a mud laden water is used. No suitable mud could be found at Roseland for mixing with the water used for drilling and a sticky clay, or gumbo, was brought from Harahan for this purpose. It required a carload of this gumbo to complete the well. About 15 per cent of clay is mixed with the water. The action of this mud laden fluid on sands, or other porous formations may be likened to the action of muddy water in passing through a filter. Most of the sediment is deposited on the surface of the filter and some of it enters the filter, the portion diminishing as the filtering medium is penetrated. The clay from a mud laden fluid in a well will penetrate a porous formation in the same manner, the penetration depending on the porosity of the formation and pressure of the fluid in the well, but finally no more water will go through and the result is that the well is nicely walled up with mud. When the well is completed to the required depth, a strainer is placed in the bottom of the well and the casing withdrawn until the strainer is exposed. The Roseland well has 125 sq. ft. of strainer exposed to the sand.

The water is delivered to locomotives through two 12-in. penstocks located so as to serve both north and southbound mains. These penstocks are supplied by a 100,000-gal. cypress tank on a 20-ft. creosote frame. The foundations of the tank are of concrete set on 48 creosoted piles 25 ft. long.

Illinois Central Water Station at Roseland, La., Securing Supply from an Artesian Well

CONTENTMENT.—W. Hanley, a signalman on the North Eastern Railway of England near Selby, has been 40 years in one signal box, and it is calculated that he has walked to and from his work 61,000 miles.

COST ACCOUNTING ON THE COLEMAN CUT OFF

By J. B. Skeen

Assistant Engineer, Atchison, Topeka & Santa Fe, Los Angeles, Cal.

A brief description of the construction of the Coleman Cut-Off was published in the *Railway Age Gazette* of February 13, 1914. It has been suggested that an outline of the methods of keeping the records on this piece of construction work would be of more than passing interest at this time, as the physical valuation of common carriers by the federal government now under way, as well as the valuation of railroads by various state commissions, makes the subject of cost keeping an important one. The rigid investigation of the carriers' records by the valuation engineers will, without doubt, bring to light the fact that with most roads this feature has been given little consideration in the construction of new lines in the past, and it will probably also be found that additions and betterments have not been recorded in sufficient detail to enable the roads to compile an appraisal of their property readily without an immense amount of searching of old records and files and extensive field investigations.

When the above work was commenced a system of bookkeeping in line with past practice on construction on this road was inaugurated on a plan that contemplated a completion report at the close of the work that would reflect the exact cost of each individual structure and facility, divided between labor, freight and material, with a further separation of charges in the case of bridges and like structures as between sub-structure, superstructure, etc. The simplest and most direct methods were employed, and if the results attained were more than ordinarily satisfactory, they were due to close application of the principles of accounting as prescribed by the Interstate Commerce Commission for expenditures of road and equipment, and a proper appreciation of the value of individual cost records that could be relied upon.

As charges accrued they were recorded by I. C. C. accounts in a journal provided with suitable headings for that purpose. This journal was balanced monthly with the auditor's books and any discrepancies were adjusted while matters were fresh, without waiting, as is often the case, until the completion of the work, to correct errors that are likely to creep in on work, involving expenditures of $500,000 to $1,000,000 per month.

A set of job ledgers covering the detailed cost of all structures was opened and every charge that it was possible to locate was entered in such a manner as to give a reference to where the minute details making up the charge could be located. Labor charges were posted in monthly order as they were incurred, the amount being entered under individual jobs and the source of the charge being given. Material charges were entered in a like manner, entries only being made of requisition or voucher number, amounts and a brief description of the material covered. All papers supporting expenditures of whatever nature were filed in monthly order, and the details of each transaction were readily located by reference to the ledger for the date charged out. Thus the same result was attained as though the details had been posted directly in the ledger, at a great saving of time and expense.

Many charges accrued every month that could not be located to definite jobs. To care for these, a "Miscellaneous" account was carried in connection with each I. C. C. account and at the completion of the work such unlocated items of expense were absorbed by applying them to the located expenditures on the basis of the relation of the unlocated charges to those that could be located, each account, of course, being treated separately in this respect. For instance, many thousands of dollars chargeable to Account 206, Bridges, Trestles and Culverts, could not be located to individual structures during the progress of the work. These items consist of the cost of pile driving equipment, tools and supplies, expense of train and enginemen distributing material, office expense, etc. This expense was carried in the books as "Miscellaneous Charges, Account 206," and prorated as above over individual structures on a cost basis at the completion of the work.

The total of the located charges and miscellaneous expense for each account was balanced each month with the account distribution, which, as before stated, was balanced monthly with the auditor's books, and errors in accounting, either in the engineering or accounting department, were more readily located, and adjustments made easier than if only costs by accounts were kept.

On a piece of work of this magnitude the economical ordering of material and supplies is a problem within itself. In this case this problem was solved in the following manner: A purchasing agent and storekeeper was installed in a field office at a point convenient to the headquarters of department heads directing the field work. Tentative orders for track, bridge, building, fence material, etc., were placed at the beginning of the work and the materials were stored at yards at either end of the line. Large amounts of other supplies were also ordered in a like manner. In order to avoid the delay that would necessarily ensue were the general practice adhered to, of requiring an approved requisition before issuing material and supplies and to fully protect the storekeeper in his issues, parties authorized to order material were supplied with memorandum requisition forms and orders for material and supplies were made on this form, the original going to the storekeeper and a copy to the chief engineer's office. These memos were given departmental and consecutive numbers and the storekeeper was instructed to fill all such orders, unless requested by chief engineer's office by wire to the contrary, after examination of the copy which reached the chief engineer's office about the time the storekeeper received the original.

At the end of each month regular requisitions were made from the memos furnished during the month and the storekeeper was furnished with approved form. They were then priced by him, covering the entire cost of the items furnished, including the cost of handling by the store department, freight, etc., and the invoice portions were forwarded to the chief engineer's office, where they were used in the scheme of cost keeping as above.

Special attention was given to the preparation of map data. Very complete right-of-way and station maps, profiles, bridge and building plans, yard layouts, ravine sections, etc., delineating the property as it was constructed, were prepared during the course of construction. In addition to the usual map data, there was compiled in considerable detail the following: Bridge list, station list, ballast statement, rail record, railroad crossing record, stock yard record, clearance chart, tie plate record, rail joint record, tie record, fence record, building record, side track record and water service record.

The value of the maps, records and cost data covering the construction of this line was fully appreciated in the preparation of the valuation of the property for the Texas railroad commission and will doubtless be appreciated as fully in the valuation for the federal government.

A New Field for Tourists.—The through passenger and freight train service between Fort William and Prince Rupert, announced recently by the Grand Trunk Pacific, will place Prince Rupert in direct touch with eastern Canada and the United States and provide a new avenue of commerce to Canadian agriculture and industry. The thriving townships in Central British Columbia which have grown up along the main line of the Grand Trunk Pacific, but which have hitherto been reached only by stage or river steamers, will quickly feel beneficial effects. The Grand Trunk Pacific now has 2,195 miles of main line in operation.

General News Department

Congressman Bryan of the state of Washington has introduced in the House a bill for the construction by the government of a railroad from Marysvale, Utah, southward into the National Forest in Arizona. Marysvale is the southern terminus of a branch of the Denver & Rio Grande.

Retrenchment on the Pennsylvania Railroad has extended to the closing of a number of small passenger stations, and it is announced that the following stations on the Pittsburgh division will be discontinued after October 3: Weaver's Old Stand, Brinkerton, Shoup, United, Trauger, Udell, Hecla, Mutual, Calumet, Rumbaugh, Mammoth, Pleasant Unity Crossing, Marguerite, Leith, Pennsville, Chambers and Biddle.

The creosoting plant of the Missouri, Kansas & Texas at West Denison, Tex., has suspended operations because of a shortage of creosote oil. Large quantities of timber and ties are on hand ready to be treated, but the company's sources of supply have been Germany and England, and both of these are now cut off. The Pennsylvania Railroad has on hand a supply of creosote sufficient for the needs of its timber preserving plant for a considerable time to come.

Thomas Cooper, land commissioner and assistant to the president of the Northern Pacific, has issued a statement announcing that during the last fiscal year the road has sold 800,000 acres of land, chiefly in Washington and Montana. A large area of eastern Washington land, suitable now only for grazing, brought 75 cents to $2.50 per acre. The company estimates the total land grant from Lake Superior to Puget Sound at 40,000,000 acres. The total sales to June 30, last, approximated 30,000,000 acres. Of the 10,000,000 acres remaining about half is still unsurveyed and unpatented. These figures were made public to refute many incorrect statements made during political campaigns, in which it has been alleged that the railway delayed federal surveying of its land to escape taxation. Mr. Cooper says that for 10 years the company has urged the government to hasten surveys, thereby enabling the company to sell its land and push development of its tributary country. The company has applied for a survey of practically all of the 5,000,000 acres still unsurveyed.

Passenger Train Disaster at Lebanon, Mo.

Twenty-seven persons were drowned early on the morning of September 15, before daylight, when a St. Louis & San Francisco westbound passenger train was derailed in a flood, caused by a cloud burst, two miles west of Lebanon, Mo., 182 miles southwest of St. Louis. Two passenger cars toppled into a deep gully filled with water. Eighteen persons were injured, but none seriously. Ninety-nine persons, including the train crew, were on the train. The fireman is among the killed, but the engineman escaped. The engineman had been running cautiously, because of the rain, and the train was moving about 15 or 20 miles an hour. A twelve-foot embankment on which the track crossed a ravine had been partly washed away by the rush of water. The locomotive and first two cars passed through on the sagging track, but the chair car and the smoking car rolled over into the torrent. The locomotive and the mail and baggage cars finally left the rails and fell into three feet of water. Four sleeping cars remained on the track. The chair car and the smoking car were submerged, and some of the occupants were drowned while they slept.

Brotherhoods Enjoined

Five conductors of the St. Louis Southwestern went into court at St. Louis on Wednesday and secured a temporary injunction restraining five vice-presidents of railwaymen's unions from bringing about a strike following an ultimatum delivered to the management of the road. The trouble arose when the management refused to reinstate a conductor who had been accused of drunkenness.

The five conductors said a majority of the engineers employed by the road had voted against a strike and that the engineers' brotherhood had withdrawn from the federation when it appeared that the strike order would be issued. The defendants must show cause next Tuesday why the injunction should not be made permanent.

Soon after the injunction was granted the railroad company asked the Federal Board of Mediation to use its offices to avert the strike. President Britton said that this action was taken in order to leave no stone unturned toward preventing the strike.

Traveling Engineers' Exhibitors

The following is a list of the exhibitors at the convention of the Traveling Engineers' Association, held in Chicago, September 15-18:

American Arch Company, New York.—Models of Security arch. Represented by Le Grand Parish, W. L. Allison, H. D. Savage, J. P. Neff, J. T. Anthony, M. K. Tate, R. J. Himmelright, E. H. Cook, T. M. Ferguson, T. F. Kilcoyne, T. Mahar, W. W. Neale, G. Wagstaff, L. S. Allen, G. M. Bean, C. E. Miller, G. E. Crisp, F. G. Boomer, C. T. Pfeiffer, G. C. Denney and C. A. Coons.

American Steel Foundries, Chicago.—Simplex couplers, coupler pockets, Vulcan and Andrews trucks, Simplex bolsters, cast steel bolsters; Ajax, Hercules and Vulcan brake beams, Economy draft arms, Davis cast steel wheels. Represented by F. A. Lorenz, Jr., W. A. Wallace and W. G. Wallace.

Ashton Valve Company, Boston, Mass.—Valves, gages and gage testing appliances. Represented by J. W. Milliwell, J. F. Gettrust and H. O. Fettinger.

Barco Brass & Joint Company, Chicago.—Metallic connections for tenders and cars, flexible joints. Represented by F. N. Bard, C. L. Miller and L. W. Miller.

Bird-Archer Company, New York.—Boiler chemicals. Represented by J. M. Robb and John Barnes.

Buda Company, The, Chicago.—Buda-Ross headlighting sets. Represented by J. W. Cleary, M. A. Ross and H. P. Bayley.

Chambers Valve Company, New York.—Chambers throttle valve. Represented by F. H. Clark and C. E. Coffee.

Chicago Car Heating Company, Chicago.—Car heating apparatus.

Commercial Acetylene Railway Light & Signal Company, New York.—Acetylene railroad signals.

Dearborn Chemical Company, Chicago. Represented by J. D. Purcell, W. S. Reid, J. F. Roddy, C. S. Murray, A. W. Cooley, F. Fosdick and C. B. Hennessy.

Detroit Lubricator Company, Detroit, Mich.—Cylinder and flange lubricators. Represented by A. D. Homard and A. G. Machesney.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Graphite products. Represented by L. W. Brooks and J. E. Simpson.

Economy Devices Corporation, New York.—Ragonnet power reverse gear, Universal steam chest, Economy engine truck, Economy exhaust nozzle, radial buffer. Represented by J. L. Randolph.

Edna Brass Manufacturing Company, Cincinnati, Ohio.—Lubricators, injectors, water glasses, water gages, boiler checks, coal sprinklers and fire extinguishsers. Represented by E. O. Corey and H. A. Glenn.

Equipment Improvement Company, New York.—Solid end main rod, lateral motion plates, flangeless shoe and wedge, removable driving box brass, packing. Represented by F. H. Clark, R. H. Weatherly and C. W. Cross.

Flannery Bolt Company, Pittsburgh, Pa.—Tate flexible staybolts. Represented by W. M. Wilson and B. E. D. Stafford.

Franklin Railway Supply Company, New York.—Franklin locomotive drifting valve, Franklin fire door, Franklin water joint, Franklin strainer valve. Represented by W. L. Allison, W. H. Coyle, R. G. Coburn, J. Sinkler, C. W. F. Coffin, J. S. Coffin, Jr., and S. D. Rosenfelt.

Galena-Signal Oil Company, Franklin, Pa. Represented by W. O. Taylor, E. V. Sedwick, J. E. Linahen, Ed. McVicker, Louis Gleason, J. S. Brown, J. S. Graham, J. A. Roosevelt, P. H. Stack, M. Meehan, Fred Smith, D. L. Eubank, W. E. Brumble, Wm. H. Holmes, W. J. Walsh, W. F. Walsh, F. J. Walsh, J. G. Arn, H. H. Hale and Chas. Royal.

Garlock Packing Company, Palmyra, N. Y.—Fibrous packing. Represented by M. E. Hamilton and G. H. Green.

Greene, Tweed & Co., New York.—Palmetto steam packing. Represented by Victor B. Nickerson and F. M. Thomson.

Grip Nut Company, Chicago.—New York pump nuts, Westinghouse pump nuts, knuckle pin nuts. Represented by B. C. Hooper.

Hammett, H. G., Troy, N. Y.—Trojan packing, Trojan bell ringer. Represented by E. C. Sawyer.

Henry Manufacturing & Grease Cup Company, Terre Haute, Ind.—Grease cups. Represented by M. Henry.

Hunt-Spiller Manufacturing Corporation, Boston, Mass.—Cylinder packing and bushing, valve packing and bushing, crosshead shoes, bull rings, piston heads, side rod bushings, driving box crown bearings. Represented by W. B. Leach, J. G. Platt, V. W. Ellet, J. M. Monroe and E. J. Fuller.

Jenkins Brothers, New York.—Extra heavy valves. Represented by B. J. Neely.

Keystone Lubricating Company, Philadelphia, Pa.—Model of Keystone driving box. Represented by J. N. Mowery.

King & Company.—Packing. Represented by J. K. King.

Leslie Company, The, Lyndhurst, N. J.—Steam heat regulators and electric headlight pressure regulators. Represented by S. I. Leslie and J. J. Cizek.

Locomotive Stoker Company, New York. Represented by L. V. Stevens.

Locomotive Superheater Company, New York.—Superheater parts. Represented by H. B. Oatley, F. A. Schaff, G. E. Ryder, R. M. Ostermann, R. R. Porterfield, G. E. Spengler, W. G. Tawse, W. Boughton, G. Fogg, B. G. Lynch, J. E. Mourne, A. C. MacLacklan, A. S. McDonald, C. D. Hilferty, W. A. Buckbee, J. Bell and C. M. Wickham.

Long, Chas. R., Jr., Company, Chicago and Louisville.—Railway paints. Represented by Chas. R. Long, Jr., G. S. Turner, W. H. Heckman and M. E. Keig.

Manning, Maxwell & Moore, New York.—Hancock inspirators, Consolidated safety valves, Ashcroft gages. Represented by C. L. Brown and F. J. Wilson.

Mudge & Company, Chicago.—Model of spark arrester. Represented by Burton W. Mudge and G. W. Bender.

Murdoch & Co., H., Pittsburgh, Pa.—Babbitt metal. Represented by A. L. Dunlap.

McCord & Company, Chicago.—Force feed lubricator, pressed steel journal box. Represented by O. H. Neal and H. E. Creer.

Nathan Manufacturing Company, New York.—Steam boiler appliances, Nathan Simplex and Monitor lifting injectors, Nathan Simplex non-lifting injectors, Nathan Simplex lifting injectors, Bull's-Eye lubricators. Represented by George Royal, A. S. Work, W. R. Walsh and J. S. Seeley.

National Boiler Washing Company, Chicago.—Model of Safety First fire door, model of locomotive cleaning device. Represented by H. A. Varney and E. B. White.

National Graphite Lubricator Company, Scranton, Pa. Represented by E. L. Pollock.

National Railway Devices Company, Chicago.—Model of Shoemaker fire door. Represented by J. D. Robinson, E. J. Gunnison and M. M. Auerbach.

National Tube Company, Pittsburgh, Pa.—Kewanee specialties. Represented by F. J. Kelley.

New York Air Brake Company, New York. Represented by R. G. Parker, W. Owens, L. W. Sawyer, G. Kleifges, B. Hyanes and O. Trieglaff.

Ohio Injector Company, Chicago.—Chicago lubricator, Chicago non-lifting injector, Ohio injector, Chicago flange oiler, hose strainer, boiler checks. Represented by F. W. Furry, W. S. Furry, F. W. Edwards, F. Wipperman and A. C. Beckwith.

Okadee Company, Chicago.—Hose coupler, drain valve, water gage, blowoff valve, locomotive sander, packing, sand dryer. Represented by H. Vissering.

O'Malley-Beare Valve Company, Chicago.—Multiplate valves, Duplex blow-outs. Represented by Edward and Thomas O'Malley.

Parkesburg Iron Company, Parkesburg, Pa. Represented by J. H. Smythe, L. P. Mercer, G. Thomas and W. H. S. Bateman.

Paxton-Mitchell Packing Company, Omaha, Neb.—Packing. Represented by C. A. Coons.

Pilliod Company, The, New York.—Model of Baker valve gear. Represented by R. H. Weatherly, F. E. Pilliod, R. Graham and F. Wilcoxen.

Pyle National Electric Headlight Company, Chicago—Electric headlights. Represented by J. Will Johnson, R. C. Vilas, W. A. Vilas, W. T. Bretherton, G. E. Haas, C. E. Kinnan, C. F. McGinnis, W. Miller and L. H. Steger.

Sellers & Co., William, Inc., Philadelphia, Pa.—Lifting and non-lifting injectors, strainers, boiler checks, coal sprinklers. Represented by John D. McClintock and L. H. Burns.

Simmons-Boardman Publishing Company, New York.—*Railway Age Gazette, Mechanical Edition; Railway Age Gazette.* Represented by L. B. Sherman, F. H. Thompson and R. E. Thayer.

Southern Locomotive Valve Gear Company, Knoxville, Tenn.—Model of valve gear. Represented by L. D. Tyson and E. L. Chollman.

Standard Heat & Ventilation Company, New York City.

Storrs Mica Company, Owego, N. Y. Represented by T. Brown.

Strong, Carlisle & Hammond Company, Cleveland, Ohio.—Sheet lubricator and set screws. Represented by B. E. Carpenter and H. B. Prescott.

United States Graphite Company, Saginaw, Mich.—Lubricating graphite, boiler graphite and graphite paint. Represented by J. G. Draught and J. W. Eviston.

U. S. Metallic Packing Company.—King type piston, valve stem and air pump packing, Leach type pneumatic sanders, Gollmar bell ringers. Represented by B. Brewster, Harry M. Wey and James J. Grogan.

Vissering & Co., Harry, Chicago and Louisville, Ky.—Sanders, bell ringers and metallic packing. Represented by Harry Vissering, G. S. Turner, W. H. Heckman and M. E. Keig.

Westinghouse Air Brake Company, Pittsburgh, Pa. Represented by A. K. Holmyer.

Federation of Trade Press Associations

The ninth annual convention of the Federation of Trade Press Associations will be held at the Congress Hotel, Chicago, Thursday, Friday and Saturday, September 24-26, 1914. The opening addresses and committee reports will be made on Thursday morning, and on Thursday afternoon there will be an editorial symposium followed by a circulation symposium. Friday morning will be devoted to an advertising symposium and Friday afternoon to a subscribers' and advertisers' mass meeting, while the annual banquet will be held in the gold room of the Congress Hotel on Friday evening. A publishers' symposium on Saturday morning completes the program.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of General Passenger and Ticket Agents.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufacturers' Association.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

American Railway Safety Association.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3d week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—Edw. J. Dugan, P. O. Box 654, August and September, Old State Capitol Bldg., St. Paul.

Engineers' Society of Pennsylvania.—Edw. R. Dasher, Box 75, Harrisburg, Pa. Regular meetings, 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, 1914, Washington, D. C.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Annual meeting, September 22-24, 1914, Bluff Point, N. Y.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE CITY TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November, Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Consolidated Music Hall, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JULY, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Arizona Eastern	367	$194,644	$33,639	$241,671	$39,262	$21,543	$2,291	$58,996	$1,027	$9,479	$132,553	$109,118	$13,738	$95,239	$15,001
Atlanta, Birmingham & Atlantic	646	174,060	65,620	260,671	42,721	39,737	14,426	102,013	.....	10,608	209,505	51,166	14,337	36,628	12,034
Atlantic City	170	77,752	270,937	360,804	23,593	26,593	2,372	150,167	69	3,608	206,403	154,401	13,500	140,901	—15,854
Bangor & Aroostook	631	170,353	56,448	243,298	53,350	44,976	2,738	82,407	1,126	9,628	194,225	49,074	8,750	40,324	13,206
Boston & Maine	2,252	2,270,090	1,573,066	4,222,986	634,455	791,922	62,166	1,777,080	19,061	96,158	3,380,841	842,145	171,070	671,075	—247,677
Canadian Pacific Lines in Maine	233	39,197	19,567	66,103	27,178	13,732	6,654	31,557	.....	3,554	82,675	—16,572	12,000	—28,572	16,494
Carolina, Clinchfield & Ohio	248	171,121	21,171	196,966	19,022	26,178	7,125	38,252	.....	8,981	97,366	99,600	14,250	85,350	—36,640
Carolina, Clinchfield & Ohio of S. C	18	8,936	1,772	10,928	792	97	1,698	2,116	.....	412	5,115	5,814	750	5,064	—2,230
Central Vermont	411	229,216	80,895	336,099	43,841	53,629	9,314	156,237	2,929	7,278	273,228	62,871	15,760	47,111	18,418
Chicago & Alton	1,033	782,073	396,085	1,279,437	162,339	290,197	36,366	411,422	10,549	28,999	939,871	339,567	44,650	294,719	—15,260
Chicago & Eastern Illinois	1,282	949,752	265,811	1,315,453	141,213	243,451	22,619	445,056	7,720	33,319	893,378	422,075	56,900	365,153	109,453
Chicago, Burlington & Quincy	9,264	5,067,898	2,119,251	7,861,573	997,763	1,390,164	128,304	2,356,820	68,070	168,735	5,109,855	2,751,719	332,528	2,419,191	132,295
Chicago Great Western	1,427	694,426	288,099	1,082,558	186,486	197,139	44,286	401,302	7,009	33,818	869,418	213,140	48,668	164,276	—119,067
Chicago, Rock Island & Pacific	7,852	3,652,177	1,731,128	5,801,511	959,288	1,065,660	147,602	2,246,571	47,241	140,009	4,599,687	1,201,824	231,202	970,385	90,467
Chicago, Terre Haute & Southeastern	375	165,229	19,326	190,313	31,344	37,448	2,826	50,759	780	8,795	131,952	58,361	11,500	46,861	27,749
Denver & Rio Grande	2,562	1,385,041	486,187	2,003,630	410,508	371,920	39,069	561,778	35,446	58,997	1,476,872	526,758	90,000	436,664	53,985
Denver & Salt Lake	255	90,143	52,657	151,079	21,969	25,698	3,145	46,656	.....	6,401	103,707	47,371	4,500	42,872	3,019
Duluth, South Shore & Atlantic	627	160,947	102,727	293,357	62,964	36,613	7,642	105,204	4,428	15,051	231,902	61,455	19,000	42,455	—13,285
Georgia	307	151,568	80,040	255,426	29,829	48,919	13,126	108,026	.....	8,582	208,483	46,943	3,089	43,854	28,565
Georgia, Southern & Florida	395	123,313	68,115	217,252	26,300	44,038	8,021	83,128	.....	8,842	170,329	46,923	10,943	35,972	14,773

REVENUES AND EXPENSES OF RAILWAYS

TWELVE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	General.	Total.					
Arizona Eastern	367	$2,213,876	$447,362	$2,797,811	$373,251	$345,200	$25,171	$772,018	$129,212	$1,644,852	$1,152,959	$1,138	$160,658	$993,439	—$103,139
Atlanta, Birmingham & Atlantic	646	2,424,184	682,029	3,399,360	539,650	542,909	170,408	1,375,044	138,942	2,766,953	632,407	.....	172,042	460,365	58,299
Atlantic & St. Lawrence	167	1,147,275	369,656	1,657,507	262,754	258,355	52,554	784,997	52,603	1,411,263	246,244	.....	129,735	116,509	98,403
Atlantic City	167	759,793	1,478,530	2,362,604	449,058	372,975	31,146	1,155,175	15,348	1,823,712	538,292	—36,360	149,000	352,932	28,244
Bessemer & Lake Erie	204	7,949,046	406,834	8,488,073	888,155	2,412,139	119,963	2,213,179	162,751	5,796,187	2,691,886	.....	336,000	2,355,886	—1,254,138
Birmingham Southern	44	678,302	13,194	1,161,830	191,593	179,505	5,910	406,584	52,264	835,856	325,974	.....	25,222	300,752	—138,037
Boston & Maine	2,252	27,866,098	15,851,615	47,413,906	6,545,830	7,733,871	465,058	22,189,351	1,362,569	38,296,679	9,117,227	$186,240	2,059,017	7,244,450	—1,329,918
Central of Georgia	1,924	9,160,090	3,815,474	14,210,743	2,065,361	2,794,131	429,583	4,963,489	492,705	10,745,269	3,465,474	75,337	631,597	2,909,214	—95,639
Central of New Jersey	678	20,812,771	5,571,721	27,372,315	3,314,272	4,705,571	381,524	8,803,493	578,185	17,783,045	9,589,270	—80,022	1,339,454	8,169,794	—2,243,996
Central New England	299	3,122,565	461,176	3,764,255	586,407	466,038	15,259	1,394,418	53,241	2,515,403	1,248,852	—3,490	126,804	1,118,558	—496,270
Chicago & Alton	1,033	8,882,611	4,130,289	14,156,232	1,818,777	3,611,194	512,304	5,599,737	445,888	11,987,900	2,168,332	—41,673	569,070	1,557,589	—336,025
Detroit, Grand Haven & Milwaukee	191	1,544,811	651,056	2,558,130	338,695	388,176	82,432	1,392,177	69,781	2,271,261	286,869	981	40,272	247,578	181,080
Grand Trunk Western	347	4,624,961	2,140,959	7,184,559	893,497	1,280,033	271,630	3,364,384	229,330	6,038,874	1,145,685	—23,979	431,032	690,674	—728,222
Louisville & Nashville	4,941	42,868,078	13,082,509	59,682,778	9,323,206	12,239,795	1,334,264	26,638,428	1,247,015	44,782,708	14,900,070	25,118	2,777,540	12,147,648	—765,972
Louisville, Henderson & St. Louis	200	870,327	417,773	1,371,797	271,012	176,053	59,249	472,191	38,571	1,017,076	354,721	2,094	45,463	311,352	149,514
Missouri Pacific	3,920	19,490,425	4,848,431	26,622,040	4,100,381	4,974,142	680,954	11,179,598	841,007	21,776,082	4,845,958	—42,647	1,170,180	3,633,131	—1,189,271
New Orleans Great Northern	283	1,329,083	389,774	4,873,613	248,658	228,788	30,955	531,386	90,164	1,129,951	743,662	—880	33,583	709,199	8,658
New York, New Haven & Hartford	2,046	32,476,373	27,400,673	66,617,693	8,831,064	10,389,458	502,020	26,828,688	1,924,120	48,515,350	18,102,343	85,480	3,568,219	14,619,604	—3,697,251
Northern Pacific	6,325	48,058,812	15,707,000	68,544,802	9,363,824	8,063,102	1,270,881	21,710,988	1,063,258	41,472,053	27,072,749	304,820	5,030,584	22,346,985	—1,965,648
Philadelphia & Reading	1,020	37,889,771	7,011,549	47,123,370	5,324,868	8,720,246	519,858	16,440,045	788,191	31,793,208	15,330,162	369,766	1,267,503	14,432,625	—4,693,705
Port Reading	21	1,286,958	.....	1,335,956	169,016	2,871	466	447,831	5,206	625,390	710,566	39,688	174,000	576,254	—430,071
St. Louis, Iron Mountain & Southern	3,365	24,504,603	6,311,203	33,171,860	4,435,665	5,278,115	649,132	10,112,758	870,620	21,346,290	11,825,570	—30,717	1,343,253	10,451,600	224,847

Traffic News

The twenty-eighth annual convention of the Canadian Ticket Agents' Association will be held at the Hotel Sherman, Chicago, on October 6, 7 and 8.

After resisting the state authorities in the courts for several years, the Louisville & Nashville, it is said, has finally accepted a tariff of reduced freight rates prescribed for it in Alabama.

Passenger service between the City of Mexico and El Paso, Tex., was resumed on September 9, when the first through passenger train for public service arrived at the border at Juarez.

The principal railways in Missouri on Wednesday of this week filed with the Missouri Public Service Commission applications for authority to increase passenger rates to three cents a mile on main lines and four cents on branches.

The New York Central, in conjunction with the American Express Company will send two agents to the principal cities of South America with a view to promoting more intimate commercial relations between this country and Brazil, Argentina, Uruguay, Chile and Peru.

R. D. Sangster, who has been manager of the Traffic Bureau of Muskogee, Okla., has been appointed transportation commissioner of the Commercial Club of Kansas City, Mo., to succeed H. G. Wilson, who recently resigned to take a similar position in Toledo.

Representatives of the tap-line railroads of the southwest held a conference last week in Chicago to discuss the denial of milling-in-transit privileges in the tap-line order recently issued by the Interstate Commerce Commission. A conference with the trunk lines will be asked.

The Official Classification Committee has announced a preliminary hearing to be held in New York on September 22, on proposed changes for the next issue of the classification. A preliminary hearing will also be held in Chicago, in the offices of the Central Freight Association, on September 17.

Congressman Clark, of Florida, has introduced in the House a bill directing the Interstate Commerce Commission to equalize rates on fruit and vegetables. The purpose of the bill appears to be either to reduce the rates on fruit from Florida or to increase those on similar commodities from California, with a view to removing existing differences.

An agreement has been reached between the Sunset-Central Lines and their telegraph operators in the wage controversy in which the employees some time ago took a strike vote. The agreement provides for an increase in wages of 5 per cent with no change in hours. The men had demanded a 12½ per cent increase in wages and a reduction of hours.

The Erie Railroad has made use of the Cape Cod Canal. One of the railroad company's tugs which is engaged in the coal carrying traffic between New York and Massachusetts ports, returning from Boston, August 11, passed through the canal on the 12th, towing three empty barges. The trip through the canal took two hours, forty minutes. For a part of the time the tide was running against the vessel, the speed of the current being estimated at about two knots an hour.

Gerrit Fort, passenger traffic manager of the Union Pacific, explains as follows the recent action of the Union Pacific in closing the Ogden gateway to through passengers via the Denver & Rio Grande, which has aroused a controversy among the western railways: "What we have actually done is to request our eastern connections not to 'short haul' us on business destined to territory which is strictly local to the Union Pacific system. Only the state of Idaho and a small part of southern Montana are involved, and we have not cut off a single privilege affecting the Colorado cities. The Union Pacific has its own line to Colorado, Utah and Idaho, and owns the short and direct line between Denver and Salt Lake City and all points on the Oregon Short Line. It has eight daily passenger trains operating over its main line and furnishes adequate service

for all passengers desiring to reach Oregon Short Line points. In deciding that it does not wish to longer divide this business with the Denver & Rio Grande railroad it is simply following a well-established precedent, as all the railroads of the United States undertake to secure, wherever possible, their long haul to and from their own local territory. For example, the Missouri Pacific Railway, a part of the Gould system, issued on May 6, 1913, a circular, No. 681, calling in all forms of one-way tickets destined to Colorado points and beyond reading over lines other than the Missouri Pacific west of Kansas City. The Gould system is, therefore, in the inconsistent position of objecting to a policy to which one of the units of that system is already committed."

The Department of Agriculture estimates that the total of all the grain crops of the country this year will be 4,853,000,000 bushels or 302,000,000 bushels more than the quantity actually harvested last year, an increase of 6¼ per cent. Because of the corn crop shortage, the estimated total is less by 680,000,000 bushels than the great harvest of 1912; but the aggregate value of the three principal grain crops—wheat, corn and oats—is $3,400,000,000, whereas their estimated value after harvest last year was $2,741,000,000. The wheat crop amounts to the unprecedented total of 896,000,000 bushels, which, it is estimated by the department, will allow for an export surplus of 300,000,000 bushels, exceeding all previous figures and more than doubling the export from the large crop of 1913.

Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 175, giving a summary of car surpluses and shortages by groups from May 1, 1913, to September 1, 1914, says: The total surplus on September 1, 1914, was 165,244 cars; on August 15, 1914, 174,260 cars, and on September 1, 1913, 73,576 cars. The report for this period shows a further decrease in the total surplus of 9,016 cars from August 15, all of which decrease is in coal cars.

There is an increase in surplus box cars in the southern and western states of approximately 7,000, about half of which is in Montana, Wyoming and Nebraska (group 7), with reductions in eastern and central states and Canada.

The largest decreases in surplus coal cars are in the eastern states and central freight association territory (groups 2 and 3), with a smaller reduction on the Pacific coast, while a slight increase is noticeable in the northwest.

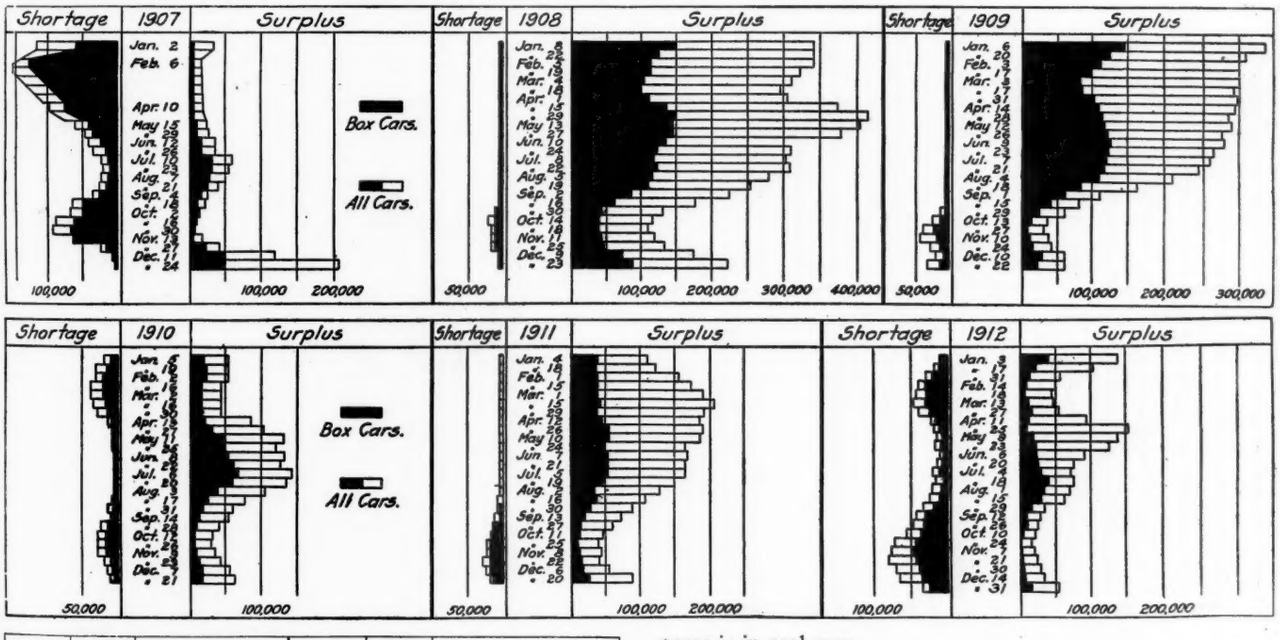
The total shortage on September 1, 1914, was 1,918 cars; on August 15, 1914, 2,115 cars, and on September 1, 1913, 15,270 cars. The shortage shows a further slight reduction.

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages 1907 to 1914.

CAR SURPLUSES AND SHORTAGES

Date	No. of roads.	Surpluses: Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages: Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—September 1, 1914	9	817	426	1,288	622	3,153	416	0	0	13	429
" 2.— " 1, 1914	32	703	148	11,343	5,068	17,262	206	0	0	0	206
" 3.— " 1, 1914	30	1,601	762	18,394	3,273	24,030	533	100	0	213	846
" 4.— " 1, 1914	12	7,620	1,410	3,176	1,472	13,678	0	0	0	0	0
" 5.— " 1, 1914	24	2,498	343	2,779	2,505	8,125	0	2	0	30	32
" 6.— " 1, 1914	27	18,676	1,271	4,078	5,447	29,472	167	4	3	2	176
" 7.— " 1, 1914	4	5,055	55	665	510	6,285	0	0	0	0	0
" 8.— " 1, 1914	15	7,512	623	1,848	3,477	13,460	0	1	46	0	47
" 9.— " 1, 1914	14	2,058	178	241	941	3,418	31	6	13	3	53
" 10.— " 1, 1914	22	7,961	1,022	2,329	9,378	20,690	111	10	4	4	129
" 11.— " 1, 1914	5	21,885	1,118	0	2,668	25,671	0	0	0	0	0
Total	194	76,386	7,356	46,141	35,361	165,244	1,464	123	66	265	1,918

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages, 1907 to 1914

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission on September 11 received a protest against the tariffs recently issued by important eastern roads increasing by 12½ per cent the prices to be charged for mileage tickets.

The Interstate Commerce Commission has postponed the effective date of its recent order in the southeastern fourth section case from October 1 to April 1, 1915, in order to give the roads more time to make the necessary readjustments in their rates, and to compile tariffs. The commission has also postponed the effective date of its orders in the intermountain case from October 1 to November 15. The commission has also issued an order allowing the roads in Central Freight Association territory to file tariffs embodying the 5 per cent advance on 10 days' notice.

Rates on Coal to Geneva, N. Y.

Empire Coke Company v. Buffalo & Susquehanna et al. Opinion by Chairman Harlan:

Rates for the transportation of coal from mines in the Clearfield region of Pennsylvania to Geneva, N. Y., not found to be unreasonable or unduly discriminatory. The withdrawal of a rate of $1.25 per ton applicable only on coal to be coked in transit at Geneva, N. Y., is held to have been justified by the carriers, on the ground that it was a preferred rate to a single city and industry, and was not in fact a true milling-in-transit rate. Complaint dismissed. (31 I. C. C., 574.)

Rates on Salt from Michigan Field

Colonial Salt Company et al. v. Chicago, B. & Q., et al; Same v. Illinois Central et al. Opinion by Chairman Harlan:

Present rates for the transportation of salt from the Michigan field to destinations in various western states are unduly prejudicial as compared with salt rates from Chicago and Milwaukee to such destinations. Salt rates from the Michigan field to points in Illinois should not exceed by more than 2½ cents per 100 lb. those from Chicago and Chicago rate points to the same destinations. No change should be made in the present relationship in salt rates as between the Ohio and the Michigan fields. A readjustment should be made which will place the salt rates from Chicago, Detroit and Akron to the Ohio river crossings upon a more equitable basis. Subsequent hearing will be had upon the fourth-section applications. Reparation denied. (31 I. C. C., 559.)

Switching Rate at Arcade, N. Y.

Buffalo, Attica & Arcade Railroad v. Buffalo & Susquehanna et al. Opinion by Chairman Harlan:

The switching rate on interstate traffic moving between the junction of the Buffalo & Susquehanna and industries and team tracks on the Buffalo, Attica & Arcade, at Arcade, N. Y., on commodities other than coal and coke is prescribed at $5 per car, and on coal and coke at 15 cents per ton, with a minimum charge of $5 per car.

This proceeding follows and is closely related to the case entitled *Switching at Arcade, N. Y.*, 30 I. C. C., 501 (*Railway Age Gazette*, p. 1560); the two roads could not agree and so this proceeding was begun. The commission increases the switching rate from $3 a car to $5 a car and expects the B. & S. to absorb all or a part of the increase. If, in 60 days, the roads do not act the commission will order a through rate. (31 I. C. C., 583.)

STATE COMMISSIONS

The Arizona Corporation Commission has issued a general order to the railroads authorizing free carriage of household goods and personal effects of employees who are transferred between points in the state.

F. W. Gomph, agent for the Pacific Freight Traffic Bureau, has asked the California Railroad Commission for authority to increase the charge for sanding stock cars from 50 cents to $1 for single-deck cars, and from $1 to $2 for double-deck cars, on the ground that the average cost of sanding single-deck cars is $1.25 and double-deck cars in proportion.

The Michigan Railroad Commission has rendered a decision that the Delray Connecting Railroad is a plant facility of the Solvay Process Company and the Semet Process Company of Detroit, and that trunk line railroads need not absorb its switching charges on business for these two companies. The commission holds, however, that the road is a common carrier as to other traffic and that the railroads must absorb the charges.

The railways in Central Freight Association territory have filed petitions with the state commissions of Ohio, Indiana and Pennsylvania for permission to publish tariffs embodying the five per cent advance in freight rates allowed by the Interstate Commerce Commission for interstate traffic, on less than statutory notice. The commissions have all reserved decision, and will probably ask for hearings.

The Washington Public Service Commission has recently had the novel experience of an application from a shipper for an advance in rates. The Granger Brick Company, of Yakima county, set forth that it had established its plant at Granger while the rate on brick from Seattle to North Yakima was 12 cents. Subsequently, when North Yakima needed a large quantity of brick for street paving, the rate from Seattle was reduced to 9 cents, greatly to the detriment of the Granger company's business.

James E. Quan, chairman of the Illinois Public Utilities Commission, has announced that the commission is contemplating a strong recommendation to the legislature for more stringent legislation against trespassing. The commission in investigating accidents has come to the conclusion that the state laws on this point are inadequate. "We hope, said Mr. Quan," to make railroad trespassing a serious offense so that the public will stay off the railroad property, such as bridges, yards and right of way. We would also include in the proposed legislation measures providing a penalty for the railroads that fail to do their share toward keeping the public off their property."

COURT NEWS

In the United States District Court at Nashville, Tenn., September 9, a decree was entered denying the government the right to have free access to the correspondence files of the Nashville, Chattanooga & St. Louis. This suit is the one which was brought by the attorney general in seeking to carry out the resolution of the Senate calling for a sweeping investigation of the doings of the Louisville & Nashville and its controlled lines.

In the Federal Court at Philadelphia, September 15, the Pennsylvania Railroad Company and Harvey C. Miller, and John F. McLoughlin of the grain firm of L. F. Miller & Sons, pleaded guilty to four counts of an indictment charging them with unlawful rebating. The court imposed a fine of $1,000 on each of the defendants for each count, aggregating $12,000. One of the charges was that the grain men made false reports of the weight of grain, and that the railroad in accepting these reports was in effect granting rebates. The government agreed to drop the other counts in the indictment and also six other indictments. This is the case in which a jury disagreed last summer after a six weeks' trial.

In the federal court at San Francisco, Cal., September 14, Judge Maurice T. Dooling issued a permanent injunction. restraining Attorney General U. S. Webb and the state railroad commission from enforcing the punitive provisions of the California pipe line act, passed by the last legislature, against the Associated Pipe Line Company, a subsidiary of the Southern Pacific Company. It was held that the fine, $15,000 a day, was excessive, and the effect of the decision is to remove what the court called the "dread of excessive and unreasonable penalties," until the state courts, or if need be, the United States Supreme Court, can pass on the constitutionality of the act. The pipe line act, which became effective August 10, 1913, declared all pipe lines common carriers, and ordered all pipe line companies to file their rates with the commission, or stand liable to a fine of 50 cents a barrel a day. The Associated Pipe Line has a capacity of 30,000 barrels a day.

Railway Officers

Executive, Financial, Legal and Accounting

Frank W. Blair, one of the three receivers of the Pere Marquette at Detroit, Mich., has resigned.

E. J. White, general attorney of the Missouri Pacific-Iron Mountain system at Kansas City, Mo., has been appointed general solicitor, with headquarters at St. Louis, succeeding the late Martin L. Clardy, and E. G. Merriam, assistant to vice-president and general solicitor, has been appointed assistant general solicitor, with headquarters at St. Louis.

Operating

J. B. Mertes, local freight agent of the Wheeling & Lake Erie at Toledo, Ohio, has been appointed inspector of yards and stations, with headquarters at Toledo.

B. C. Cooper, trainmaster of the Peoria division of the Vandalia at Decatur, Ill., has been transferred to Logansport, Ind., as trainmaster of the Michigan division, succeeding O. E. Linn, transferred.

W. E. Price, superintendent and traffic manager of the Carolina & Yadkin River, at High Point, N. C., has been appointed general manager, with headquarters at High Point, and the office of superintendent has been abolished.

J. F. Jones having been relieved of the duties of superintendent of terminals of the Grand Trunk on account of ill health, F. J. McKee, acting superintendent of terminals at Port Huron, Mich., has been appointed superintendent of terminals, with office at Port Huron.

Traffic

J. M. Andrews has been appointed livestock agent of the Texas & Pacific at Ft. Worth, Tex.

J. A. Scheurman has been appointed assistant general passenger agent of the Detroit, Toledo & Ironton, with headquarters at Detroit, Mich.

C. E. Jordan, Jr., has been appointed contracting agent of the Louisville & Nashville, with office at Knoxville, Tenn., succeeding Frank L. Salisbury, transferred.

E. L. Dalton has been appointed general agent freight department of the Chicago & Alton at Chicago, succeeding B. J. Libbe, resigned, to engage in other business.

W. S. Smith, traveling freight agent of the Frisco Lines, with headquarters at Houston, Tex., has been appointed assistant general freight agent of the St. Louis, Brownsville & Mexico, with headquarters at Kingsville, Tex.

F. J. Sizemore, assistant traffic manager of the Carolina & Yadkin River, at High Point, N. C., has been appointed traffic manager, with headquarters at High Point, succeeding W. E. Price, promoted; and the office of assistant traffic manager has been abolished.

G. C. Whitney, traveling freight agent of the Queen & Crescent Route at Dallas, Tex., has been appointed commercial agent with headquarters at Greensboro, N. C. This is a new agency and formerly this territory was under the jurisdiction of C. C. Elder, commercial agent at Charlotte, N. C.; G. F. Kay, soliciting freight agent at Houston, has been appointed traveling freight agent succeeding Mr. Whitney.

George E. Herring, district passenger agent of the Louisville & Nashville, at Nashville, Tenn., has been appointed division passenger agent, with office at St. Louis, Mo., succeeding R. C. Wallis, who has been appointed district passenger agent at Nashville, succeeding Mr. Herring. C. H. Mann, traveling passenger agent at Houston, Tex., has been appointed district passenger agent at Pensacola, Fla. H. H. Milner, city passenger agent at Atlanta, Ga., has been appointed traveling passenger agent at Houston, succeeding Mr. Mann. D. W. McDonald, traveling passenger agent at Pensacola, succeeds Mr. Milner, and the position of traveling passenger agent at Pensacola, Fla., has been abolished.

Engineering and Rolling Stock

Elmer H. Brown has been appointed roadmaster of the Northern Pacific at Dilworth, Minn.

A. E. Reid has been appointed supervisor of signals of the Chicago & North Western, at Boone, Iowa, succeeding K. E. Kellenberger, resigned.

E. H. Peck, assistant engineer of the Chicago, Burlington & Quincy, has been appointed engineer Missouri district, with headquarters at St. Louis, Mo., to succeed F. M. Paterson, resigned.

C. A. Zweibel has been appointed supervisor of car repairs of the Atlantic Coast Line, with office at Wilmington, N. C., succeeding E. A. Sweeley, resigned, to go to another company.

S. S. Senter, engineer of construction of the Wheeling & Lake Erie, at Brewster, Ohio, has been appointed superintendent of bridges and buildings, with headquarters at Brewster, and his former position has been abolished.

OBITUARY

Barney F. Keefe, general agent of the Chesapeake & Ohio, with office at Covington, Ky., died on September 6 at Toledo, Ohio.

N. M. Markley, for many years supervisor of bridges and buildings of the Peoria & Eastern division of the Cleveland, Cincinnati, Chicago & St. Louis, died at his home in Arcanum, Ohio, September 5, aged 67 years.

Amos Howard Calef, secretary and treasurer of the Missouri Pacific, with office at New York, died on September 16, at his summer home at Seabright, N. J., at the age of 71. The cause of his death was acute indigestion and heart disease. Mr. Calef was for many years closely associated with the Gould railroad interests. Mr. Calef was born in Gloucester, Mass., and began railroad work as a clerk. He was with the Kansas Pacific and the Denver Pacific, now a part of the Union Pacific system. In 1880 he went to New York as secretary and treasurer of the Missouri Pacific system.

Thomas E. Adams, superintendent of motive power of the St. Louis Southwestern, with headquarters at Pine Bluff, Ark., died at his home in that city on August 25 at the age of 63 years. Mr. Adams had been in railway service since August, 1865, when he began as a fireman on the Illinois Central. He was consecutively locomotive engineer on that road, the Illinois Midland, the St. Paul, Minneapolis & Manitoba and the Great Northern, from November, 1870, to February, 1893, when he was appointed division master mechanic on the Great Northern. Three years later he became superintendent of the Dakota division of that road, and from February, 1897, to April, 1901, he was successively master mechanic of the Fergus Falls division and at Superior, Wis. He then went to the St. Louis Southwestern as general master mechanic, and in July, 1905, was promoted to superintendent of motive power.

EXPORT COAL TRAFFIC.—With a view to aiding the coal operators of the United States to expand their markets at a time when the exporters of other coal-producing nations are inactive, the Bureau of Mines has issued a bulletin describing American coals, which, printed in Spanish, Portuguese and English, will be distributed among the large coal-users and importers of South and Central America. The bulletin lists as available for this promising export trade seven groups of coal fields. These are the Pocahontas and New River coals of West Virginia, with Norfolk and Newport News as shipping ports; the Maryland and eastern Pennsylvania coals, to go through Baltimore or Philadelphia; the Virginia, Kentucky and Tennessee coals, through Hampton Roads or Charleston; the Alabama coals, through Mobile or New Orleans; the western Pennsylvania coals, through New Orleans; the Illinois and Indiana coals, through New Orleans; and the Washington coals, through Seattle.

Equipment and Supplies

LOCOMOTIVE BUILDING

The San Pedro, Los Angeles & Salt Lake has ordered one Mikado type locomotive from the Baldwin Locomotive Works.

W. R. Grace & Co, New York, are making inquiries for three 2-8-0 type locomotives for a railroad in Chile.

The Louisville & Jeffersonville Bridge Company, Louisville, Ky., has ordered one superheater six-wheel switching locomotive from the American Locomotive Company. This locomotive will have 21 by 28 in. cylinders, 51 in. driving wheels and a total weight in working order of 163,000 lb.

CAR BUILDING

The Lehigh & Hudson River, reported in the *Railway Age Gazette* of August 21, as being in the market for 20 50-ton steel ore cars, has ordered that equipment from the Pressed Steel Car Company.

The Rutland, reported in the *Railway Age Gazette* of last week as having ordered 75 50-ton steel hopper cars from the Standard Steel Car Company, has ordered 100 of these cars from that company.

SIGNALING

Automatic Signals on the Burlington in Colorado

The Chicago, Burlington & Quincy has put in service 24 miles of automatic block signals near Akron, Col., the work being done by the Federal Signal Company. The section now completed is that from Akron, westward to and including the Brush (Col.) yards, at which place the Billings-Denver line forms a junction with the Chicago-Denver line. This installation comprises 19 one-arm home signals, 19 one-arm distant signals, 9 two-arm home and distant signals and one signal equipped with a calling-on arm in addition to home and distant arms.

All signals have the Federal Signal Company's type "4" mechanisms fitted with enameled corrugated steel blades, operating in two positions, 0 deg. to 60 deg., in the lower quadrant.

Separate distant signals are used, and they are set approximately 2,500 feet in the rear of the home signals, excepting the distant signal of the home signal governing movements out of the passing tracks. These distant signals are located on the same mast as the home signal at the entering end of the passing track.

The day indications are distinguished by the different types of blades. Absolute home signals have square end blades enameled red with a white stripe; distant signals fish-tail blades enameled green with white stripe. Two permissive home signals, one between Akron and Xenia, and one between Story and Brush, have yellow blades with square end and black stripe. These have yellow glass and are governed by special instructions.

An "absolute permissive" scheme of wiring, using neutral line circuits, developed by the signal department of the railroad company, is used throughout this section. A selecting interlocking relay, especially designed and manufactured by the Federal Signal Company, is used in this arrangement. One set of contacts is mechanically locked by the electrical releasing of another set. For example, a train moving westward releases one side of the interlocking relay which prevents the opening of the contacts on the opposite side, through which the westbound signals are controlled. Permissive indications are displayed for following movements as soon as all track circuit sections, in a block section, are clear. For the opposite direction the other side of the interlocking relay is similarly released.

All switches leading into the main tracks are fitted with style "D" switch boxes and style "C" switch indicators.

An additional length of 88 miles will be put in service about the middle of October.

Supply Trade News

W. E. Marvel, recently elected vice-president of the Positive Rail Anchor Company, has sold his entire interest in the M-C-B Company, Chicago, to R. L. Brown.

The Raymond Concrete Pile Company, New York, has been awarded a contract for the design and construction of concrete ore, coke and limestone bins, and ore and yard trestles, by the Pennsylvania Steel Company, Steelton, Pa. The work calls for several thousand concrete piles and a large yardage of concrete construction.

At a meeting of the board of directors of the American Locomotive Company, held September 16, S. L. Schoonmaker was elected chairman of the board, succeeding Pliny Fisk, resigned, and Andrew W. Mellon, president of the Mellon National Bank of Pittsburgh, was elected a director succeeding James McNaughton. Mr. McNaughton will continue as vice-president of the company. Mr. Schoonmaker is a director of the General Electric Company and the American Telephone & Telegraph Company.

American Locomotive Company

As predicted by President Marshall in March, the American Locomotive Company earned little more than expenses in the second half of the fiscal year ended June 30, 1914. During the first half of the year, however, the company had earned its fixed charges and 7 per cent dividends for the entire year on its $25,000,000 preferred stock. It, therefore, completed the fiscal year with a surplus of $326,127. This compares with a surplus, after the payment of 7 per cent dividends in 1913, of $4,435,305. The new locomotive orders received during the entire year amounted to but $14,454,831, which, as President Marshall points out in his annual report to stockholders, is only about 25 per cent of the company's capacity. As a matter of fact, during the first half of the year the company's plants averaged 67 per cent of their capacity, and in the last half of the year, 29 per cent; but at the beginning of the year unfilled orders amounted to $17,156,388, and at the end of the year, $4,162,365. Business was taken on a very small margin of profit; consequently it was impossible to cut down expenses in the same proportion as the loss in gross earnings. Thus, the gross earnings in 1914 were but $29,987,438, a decrease of $24,880,737, whereas expenses, including maintenance and depreciation, were $27,425,187, a decrease of but $20,616,505.

The company made the best of the falling off in business by strengthening its financial position. At the beginning of the year there were $13,326,031 accounts collectable, and the company had $1,562,474 cash on hand. At the end of the year there were $5,114,531 accounts collectable, and cash and cash items, including a little over $1,000,000 New York City stock certificates and city of Newark revenue bonds, of $8,411,467. Materials and supplies, which amounted to $5,749,234 at the beginning of the year, had been reduced to $2,707,505, the market value of materials and supplies having fallen very much during the year and the company having written down the book value of materials and supplies by a substantial amount and charged that amount against the year's income. Total current liabilities, including gold coupon notes, amounted to $7,085,917 at the end of the year as compared with $13,726,383 at the beginning of the year.

TRADE PUBLICATIONS

Cables.—The Western Electric Company, New York, has just issued a remarkably attractive booklet called "The Making of the Voice Highways," describing the processes entering into the making of lead covered copper cables for telephones. The booklet describes the production of the copper wire, the production of the paper, the production of the lead and the antimony, the testing of the raw materials, insulating, pairing and twisting, stranding, drying, putting on the sheet and the final testing. The booklet is beautifully illustrated and printed.

Railway Construction

ALABAMA GREAT SOUTHERN.—In connection with the construction of new double track between Chattanooga, Tenn., terminal station and Wauhatchie, improvements to cost $80,000 are to be carried out on the Belt Railway of Chattanooga, including the construction of second main track between East End avenue and the wye where connection is made with the extension line now being completed through the Lookout Mountain tunnel.

ARKANSAS MINING & DEVELOPMENT COMPANY'S LINE.—According to press reports, this company plans to build a railway from Hoxie, Ark., west via Smithville, Poughkeepsie, Evening Shade and Melbourne to Calico Rock, about 70 miles. J. A. Gay, Poughkeepsie, may be addressed.

CHICAGO & NORTH WESTERN.—This company has awarded a contract for the building of a logging road from Kingston, Wis., westerly a distance of five miles, to Cleary, White & Duffy, Chicago.

EVANSVILLE & CHISNEY (Electric).—It is expected that work will be started in October on an electric line from Boonville, Ind., east to Chisney, 15 miles. The line may eventually be extended east via Cannelton and Corydon.

FLORENCE & HUNTSVILLE INTERURBAN.—Incorporated in Alabama to build an electric line from Florence, Ala., east to Huntsville, about 65 miles. A branch line is to be built from Killen northeast to Lexington, 15 miles, which is ultimately to be extended to Pulaski, Tenn. T. H. Allen, president; T. W. Pratt, vice-president, and N. F. Thompson, secretary-treasurer, Florence.

FOURCHE RIVER VALLEY & INDIAN TERRITORY.—An officer of this company writes that in addition to the 14-mile line from Bigelow, Ark., to Bellevue, a 5-mile extension was recently put in operation. The company plans to build an extension of 38 miles, but the work will not be carried out in the near future.

FREDERICK & BRUNSWICK.—See Hagerstown & Frederick.

FRONTIER ELECTRIC.—An officer writes that the company is just completing the purchase of a right of way between Niagara Falls, N. Y., and Buffalo, and may possibly do some grading on the line this fall, so that the line may be completed early next spring. J. S. Simmons, Niagara Falls, may be addressed. (August 15, p. 313.)

GREENVILLE & NORTHWESTERN (Electric).—This is the new name of the Greenville, Whitewright & Northern Traction, which was organized in 1912, to build a 25-mile electric line from Greenville, Tex., northwest. The new company will have its headquarters at Greenville, and plans to build from that place northwest via Merit, Blueridge and Westminster to Anna, thence west to Denton and then north to Gainesville, about 110 miles. A branch is also projected from Westminster northeast to Bonham, about 25 miles. A. R. Nicholson, president, Greenville.

GREENVILLE, WHITEWRIGHT & NORTHERN TRACTION.—See Greenville & Northwestern.

HAGERSTOWN & FREDERICK (Electric).—According to press reports work is to be started in November on the Frederick & Brunswick. The plans call for building from Jefferson, Md., to Brunswick, about seven miles. (April 24, p. 966.)

JEFFERSON & NORTHWESTERN.—An officer writes that a grading contract has been given to C. T. Fitts, Greenville, Tex., for work on a change of line. The grade is to be reduced from 2 per cent to 1.5 per cent and the curvature reduced from 5 and 9 degree curves to 1 and 2 degree. The work involves handling 30,000 cu. yd. of earth, and clearing four acres of land.

JELLICO COAL & RAILROAD.—Under this name a company has been organized at Chattanooga, Tenn., it is said, to build a railroad from a point near Pine Knot, Ky., on the Queen & Crescent Route southwest to Jellico, about 18 miles. It is understood that construction work is to be started in October. W. E. Wheelock, superintendent of terminals of the Queen & Crescent at Chattanooga, is president of the new company.

LOUISIANA RAILWAY, LIGHT & POWER COMPANY.—An officer writes that this company has secured a right of way, 75 ft. wide, for the electric line to be built from Lockport, La., northwest, via Thibodaux, to Donaldsonville, about 56 miles. It is expected that arrangements will be made to carry out the work in the near future. W. Ohlmeyer, president, Plattenville. (September 4, p. 452.)

MISSOURI ROADS (Electric).—Plans are being made, it is said, to build an electric line from Keokuk, Iowa, west to Wayland, Mo., thence south via Williamstown, La Belle, Newark, Bethel, Shelbyville, Shelbine, Paris, Mexico and Fulton to Jefferson City, about 140 miles. H. W. Knight of Chicago, represents a number of capitalists who are back of the project.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, is asking for bids until October 9, for the construction of section No. 1 of route No. 48, the Park Place, William street and Clark street subway, in the borough of Manhattan.

NORFOLK & WESTERN.—The report of this company for the year ended June 30, 1914, shows that the double track work under way at the end of the previous year was completed and double track work is now in progress west of Suffolk, Va., on 1.60 miles and between Zuni and Disputanta on 26.6 miles. This work is expected to be finished by January, 1915. A double track tunnel 1,257 ft. long was built at Glen Alum, W. Va., and a twin tunnel, 1,000 ft. long, for second track, was completed at Hatfield, W. Va. The Tug River & Kentucky was organized in January, 1914, to build a 17-mile line in Pike county, Ky., and Mingo county, W. Va., to reach coal deposits. The line has been located from a point in Pike county, at or near the mouth of Poplar creek, and up the valley of Poplar creek, the valley of Peters creek, and the valley of Blackberry creek also down the valley of Tug river. Work is now under way on 1.5 miles of this line, including a bridge over Tug river, and is expected to be finished by June, 1915. On the North Carolina division grading work was completed during the year on 21 miles and was approaching completion on 28 miles; bridge work was well advanced, and 8.8 miles of track was laid and surfaced. The New River, Holston & Western is building an extension from Rocky Gap to Suiter's in Bland county, Va., about 14 miles, grading has about been finished and 8.1 miles of track has been laid.

NORTH CAROLINA ROADS.—Application has been made by J. T. Deal, of the Kinston Manufacturing Company, for a franchise to build a railroad at Kinston, N. C. The plans call for building from Kinston south to Maple Hill, about 50 miles. The Kinston Manufacturing Company now operates a logging line from Pink Hill to Beulaville, about nine mines, which is to form part of the new line.

NORTHERN PACIFIC.—This company has completed work on a short connecting line, it is said, from Cedar Lake, Minn., northwest to a connection with the Minneapolis, St. Paul & Sault Ste. Marie at Ironhub.

NORTH LOUISIANA (Electric).—According to press reports a contract was let recently for building from Shreveport, La., east to Monroe, about 100 miles. A. B. Blevins, president, Jefferson. (April 3, p. 812.)

SALISBURY INTERURBAN.—This company was recently incorporated in Maryland, and will soon begin construction work, it is said, on an electric line from Nanticoke Point, Md., north via Bivalve, to Tyaskin, thence east via Salisbury to Willards, about 40 miles. E. R. White, W. H. Bedsworth, H. J. Messick and W. H. Insley are said to be interested. (April 10, p. 856.)

SUTHERLIN, COOS BAY & EASTERN.—A contract has been let to the McAllister & Son Construction Company, Portland, Ore., it is said, to build from Sutherlin, Ore., east about 27 miles to a tract of timber at the heal of Calapooya creek, and the line is eventually to be extended further east. Surveys are said to be made for an extension from Sutherlin west to Coos Bay. G. H. Glynn, A. Stark and C. E. Lemon, all of Sutherlin, are incorporators. (August 14, p. 310.)

WEST VIRGINIA ELECTRIC.—Under this name application will be made in West Virginia for a charter to build from the eastern

terminus of the Little Kanawha, at Owenport, in Wirt county, W. Va., east to Weston, about 50 miles. The plans also call for building a branch from a point near Creston south to Spencer, about 10 miles. Residents of Parkersburg are said to be back of the project.

RAILWAY STRUCTURES

BOYCE, VA.—The report of the Norfolk & Western for the year ended June 30, 1914, shows that during the year passenger stations and freight houses were built or enlarged at Boyce, Galax, Wilson and Evergreen, Va., at Willardsville, N. C.; Roderfield, W. Va., and Waverly, Ohio. A number of new turntables were installed at various places on the road. A new 1,200-ft. coal pier on concrete foundations was completed and put in operation at Lamberts Point, Va.; and new shop buildings were built and extension made to the existing structures at Roanoke, Va. The company also carried out a large amount of bridge improvement work during the year.

BUFFALO, N. Y.—An officer of the Grand Trunk writes that a contract has been given to Metz Bros., Buffalo, for putting up a combined freight station and office building on Niagara street in Buffalo. The proposed structure is to be of brick construction, two stories high, 50 ft. by 200 ft. on the first floor and 30 ft. by 125 ft. on the second floor. The improvements will cost about $75,000.

CHICAGO, ILL.—The city council has extended from September 23 until December 23, the time within which the railways may file their acceptance of the ordinances for the new Union station, the Pennsylvania Lines freight terminal and improvements in connection therewith. The Union Station Company had asked for an extension of one year on account of the impossibility of financing the project at this time.

JACKSON, MISS.—The Illinois Central has awarded a contract for the construction of a mechanical terminal at Jackson, Miss., to Geo. B. Swift & Company, Chicago. The improvement consists of structures as follows: A roundhouse having five 100-ft. stalls with walls of concrete and brick construction, and roof of wood, covered with composition roofing; an 85-ft. turntable electrically operated; a machine shop and boiler room 40 ft. by 75 ft. by 16 ft. high, with brick walls and a flat concrete roof covered with composition roofing; an oil house and storeroom 30 ft. by 60 ft. one story high, with a low wooden platform 40 ft. by 75 ft. at one end; a shelter and shop building 20 ft. by 140 ft. by 11 ft. high, of wooden construction, and sand bins, 9 ft. by 98 ft. by 9 ft. high, also of wooden construction. A 500-ton wooden coal chute which is being built by the Ogle Construction Company, Chicago.

JEFFERSON, TEX.—An officer of the Jefferson & Northwestern writes that the company has under consideration the question of building a combined passenger and freight station at Jefferson.

MEMPHIS, TENN.—An officer of the Southern Railway writes that a contract has been given to the Ragland-Baxter Morford Company, Nashville, Tenn., for the construction of shop buildings at Memphis, and a contract has been given to the R. F. Creson Company, Memphis, for putting up a pump house, also transformer house at Memphis.

NEW YORK.—The New York Public Service Commission, First district, will open bids on October 6, for the construction of the diagonal subway station under Forty-second street in front of the Grand Central station, New York. The diagonal station will be built on the line connecting the existing subway just south of Forty-second street with the new Lexington avenue subway just north of that street. It will be more than 100 ft. wide, and will have two platforms serving four tracks. A concourse is to be built above the level of the station to connect with the Grand Central station, the Lexington avenue subway, the existing subway, and the Hudson & Manhattan tubes when extended to this point. Elevators will be used to connect with the Steinway tunnel, which is at a lower level.

RICHMOND, VA.—An officer of the Southern Railway writes that a contract has been given to P. J. White & Son, Richmond, for the construction of shop buildings at Richmond, and a contract has been given to the J. T. Wilson Company, Richmond, for building a transformer house at South Richmond.

Railway Financial News

CENTRAL NEW ENGLAND.—This company has declared the full 5 per cent interest on its general mortgage bonds for the year ended July 1, 1914.

CHICAGO & WESTERN INDIANA.—This company is owned jointly by the Chicago & Eastern Illinois, the Wabash, the Grand Trunk Western, the Chicago & Erie and the Chicago, Indianapolis & Louisville, each of which owns $1,000,000 of the capital stock. In the fiscal year ended December 31, 1913, as shown by the annual report the company's total operating revenue was $174,769; the operating expenses $152,123, and the net operating revenue, $22,646. The rentals from lease of road, however, made up the larger portion of the company's income and in 1913 amounted to $2,781,646. The total other income inclusive of this amount, other rental taxes collected from tenants, parcel room receipts, etc., was $3,351,946, and the total income $3,374,592. From this income there was paid in interest on bonds, $2,256,296; taxes, $440,338, etc., leaving a net income of $637,095. Dividends were paid, in addition, to the amount of $300,000, and $210,000 was paid out as the division of surplus under the inter-tenant agreement of November, 1, 1882. The surplus for the year was $83,476, so that the total surplus on December 31 was $533,655.

The company's total property investment on December 31, 1913, was $59,892,582. There was also an item of securities issued pledged of $1,351,000. The company's working assets in turn amounted to $5,907,035, $478,414 of which was cash in treasury, $3,051,988 was cash in hands of trustees, $748,980 was consolidated mortgage bonds in treasury, $783,730 was in miscellaneous accounts receivable, etc. The deferred debit items amounted to $2,153,598. The company's outstanding stock as noted above amounts to $5,000,000. The bonded debt is now $61,180,083. The working liabilities on December 31 were $1,981,622, $1,043,873 of which was included in audited vouchers and unpaid wages, and $835,320 in matured interest due on January 1. In 1913 the Chicago & Western Indiana expended $3,265,144 for additions and betterments, the principal improvements being those on the clearing yard and on track elevation.

ERIE.—A special meeting of stockholders has been called for October 13, to vote on the approval of a "refunding and improvement mortgage covering the railroad properties, rights and franchises."

GRAND TRUNK.—This company has declared the regular 4 per cent dividends on the guaranteed stock.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—The stockholders at the annual meeting approved the plan of the directors to increase the capital stock from $42,000,000 to $62,000,000. No new stock is to be issued at this time.

O. C. Wyman, of Minneapolis, has been elected a director to succeed C. H. Petit, deceased.

PERE MARQUETTE.—Frank W. Blair, one of the three receivers, has resigned.

SOUTHERN RAILWAY.—President Harrison, in a letter to stockholders, says in part in regard to the annual meeting on October 13:

"An effort will be made to make this meeting more than the conventional routine, which current criticism finds to be characteristic of the meetings of stockholders of American railway companies, and the co-operation of the stockholder is necessary to that end. The principal officers will be in attendance to answer questions directed to the management or as to any detail of its business, and the report of operations during the last year will be before the stockholders for discussion."

ADDITION SERVICE FOR VANCOUVER.—A large number of new steamships and sailing vessels are to be added by the various shipping companies that now maintain a service out of the port of Vancouver, B. C., to meet the anticipated increase in trade incident to the opening of the Panama Canal.